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UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 29

SYSTEMATIC PLANT STUDIES

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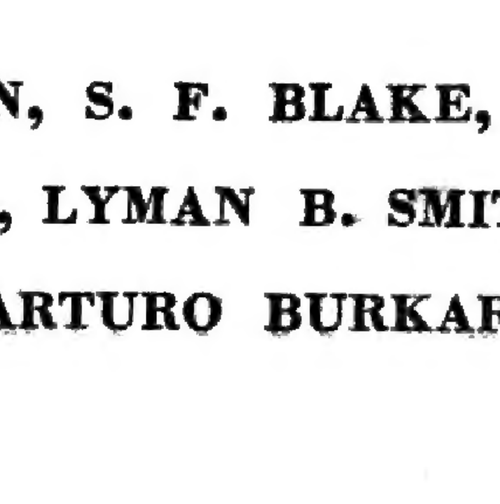

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REMINGTON KELLOGG,
Director, United States National Museum.

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Systematic Plant Studies

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 29, PART 1

TAXONOMIC STUDIES OF TROPICAL AMERICAN PLANTS

By C. V. MORTON

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BULLETIN OF THE UNITED STATES NATIONAL MUSEUM

PREFACE

The present paper, by C. V. Morton, assistant curator of the National Herbarium, deals with several groups of phanerogams of tropical America. The first five articles are devoted to Gesneriaceae, a family as yet relatively little known, and include accounts of the genera *Columnea* and *Alloplectus* as represented in the West Indies, most of the material of these genera in American herbaria having been available for study. The next three articles deal with Solanaceae, chiefly with South American species of the genus *Solanum*. In particular the species of the difficult *Lycianthes* group are listed and keyed on a geographic basis. The paper concludes with an account of the North American species of *Hybanthus* (Violaceae) and notes on several members of the family Leguminosae.

WILLIAM R. MAXON,
Curator, United States National Herbarium.

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TAXONOMIC STUDIES OF TROPICAL AMERICAN PLANTS

By C. V. Morton

INTRODUCTION

This paper, dealing with the tropical America flora, is devoted primarily to groups on which I have worked at intervals for a number of years—the Gesneriaceae and Solanaceae and the genus *Hybanthus* of the Violaceae. A few notes on Leguminosae are also included.

I am indebted to the curators of the following institutions for the loan of many valuable specimens: Field Museum of Natural History, Gray Herbarium of Harvard University, Missouri Botanical Garden, and New York Botanical Garden.

THE WEST INDIAN SPECIES OF COLUMNEA

In 1901 Urban [1] published a list of the West Indian species of *Columnea* (Gesneriaceae) in which ten species and nine varieties were recognized. In general he gave descriptions only for the novelties, and he gave no key. The present treatment differs a good deal from that of Urban. Fifteen species and three varieties are here keyed and described. The more abundant material now available shows that some of the varieties described by Urban are inconstant and of no especial taxonomic importance. On the other hand, two of them exhibit such pronounced differences that they merit the rank of species. Three new species have been described, by Urban and Britton, since the publication of Urban's list. Two of these are recognized here; the third is reduced to varietal status.

When sufficient material of a species was available I have selected and measured 50 representative leaves. I am thus able to state precisely the known maximum and minimum length and width, and I have computed also the average length and width, as well as the average ratio of length and width. The differences between the various species in these respects have frequently been found to be of diagnostic value.

KEY TO SPECIES

A. Corolla not strongly bilabiate.
  Leaves of a pair subequal, not over 4.5 cm. long. Jamaica-- **1. C. jamaicensis**
  Leaves of a pair strongly unequal, the smaller stipule-like, the larger over 11 cm. long.
  Leaf blades with scarlet spots beneath, sharply denticulate.
    Corolla 2–2.2 cm. long. Hispaniola---------- **2. C. sanguinea**
    Corolla 2.6–3 cm. long. Trinidad---- **2a. C. sanguinea** var. **trinitensis**
  Leaf blades lacking scarlet spots, obtusely low-crenate. Cuba- **3. C. cubensis**
AA. Corolla strongly bilabiate, the 4 posterior lobes connate into a lobed galea, the anterior lobe narrow and reflexed.

[1] Symb. Antill. **2:** 358–364. 1901.

B. Corolla tube included in calyx (or in *C. argentea* slightly exserted, about 1.5 times as long as calyx), densely sericeous; galea usually longer than corolla tube, obviously bilobed at apex; calyx lobes 13–40 mm. long; ovary densely sericeous all over; stigma very slightly lobed; flowers commonly 2 or 3 in an axil; leaf blades 5–17 cm. long, 2.1–5.6 cm. wide, the veins 4–8 pairs.

Leaves red or reddish all over the lower surface. Calyx lobes conspicuously laciniate-toothed; corolla yellow and red-striped; leaf blades about 3.6 times as long as wide, strigillose on both sides. Western Jamaica. **4. C. rutilans**

Leaf blades green on both sides.

Calyx bilabiate, the 4 anterior lobes connate for about one-third their length, the posterior shorter and deflexed, all entire. Corolla yellow; leaf blades hirsute, averaging 11.4 cm. in length and 5.1 cm. in width. Western Jamaica---------- **5. C. subcordata**

Calyx regular, all the lobes free and subequal.

Filaments pilosulous. Calyx lobes subulate-toothed, often red; corolla yellow and red-striped; leaf blades 2.4 times as long as broad, averaging 7.5–8 cm. long and 3.3 cm. wide.

Hairs of upper leaf surface spreading, 5–8 cells long. Blue Mountains, Jamaica---------- **6. C. hirsuta**

Hairs of upper leaf surface appressed, 2-celled. Eastern Jamaica. **7. C. fawcettii**

Filaments glabrous.

Calyx lobes glandular-denticulate, crimson. Cuba--- **11. C. tincta**

Calyx lobes entire, green or whitish.

Leaf blades and calyx sparingly and minutely strigillose with 2-celled hairs. Corolla yellow; leaf blades 2.4–2.8 times as long as wide. Western Jamaica---------- **8. C. brevipila**

Leaf blades and calyx sericeous with longer hairs.

Calyx lobes densely white-sericeous; corolla yellow; leaf blades 3.4–3.7 times as long as broad. Western Jamaica. **9. C. argentea**

Calyx lobes less densely sericeous-strigose, green; corolla yellow and red; leaf blades 2.7 times as long as wide. Western Jamaica---------- **10. C. harrisii**

BB. Corolla tube over twice as long as calyx, merely pilosulous or puberulous; galea always much shorter than corolla tube, acute or truncate; calyx lobes 7–15 mm. long in flower; ovary glabrous or sericeous only at apex; stigma deeply 2-lobed; flowers solitary; leaf blades 1.8–4.5 cm. long, 0.7–2.4 cm. wide, the veins 2–4 pairs.

Ovary glabrous; galea truncate. Calyx lobes entire, narrowed toward base. Hispaniola and Puerto Rico---------- **12. C. tulae**

Ovary hairy at apex; galea acute.

Leaf blades narrow, about 3.4 times as long as broad; corolla yellow, the throat 5–6 mm. wide, the free part of galea 5–6 mm. wide; calyx lobes entire, 7–10 mm. long, 1.8–2.2 mm. wide. Trinidad_ **13. C. tocoensis**

Leaf blades broader, 1.5–2.6 times as long as broad; corolla red, the throat 6–9 mm. wide, the free part of galea 9–13 mm. wide; calyx lobes often toothed, 9–15 mm. long, 2–5 mm. wide.

Leaf blades ovate to suborbicular, averaging about 1.5 times as long as broad, more or less toothed. Martinique, Montserrat.
14. C. scandens

Leaf blades ovate to oblong, 2.1–2.6 times as long as wide, entire or nearly so.

Calyx lobes coarsely toothed; leaf blades minutely strigillose, the hairs 2-celled, closely appressed. Grenada, St. Vincent.
14a. C. scandens var. **vincentina**

Calyx lobes entire or rarely with a single tooth; leaf blades more densely pubescent, the hairs longer, not at all appressed. Montserrat, Martinique, Tobago, Trinidad.
14b. C. scandens var. **aripoensis**

1. Columnea jamaicensis Urban, Symb. Antill. **2**: 359. 1901.
Pterygoloma repens sensu Griseb. Fl. Brit. W. Ind. 464. 1861, as to plant of Jamaica.

Scandent shrub up to 1.8 meters long, sparingly branched, the branchlets slender, about 2 mm. thick, sparingly strigose when young, soon glabrous, shining; leaves of a pair subequal or slightly unequal, petiolate, the petiole 5–10 mm. long, slender, very sparingly strigose; leaf blades oblong or ovate (average ratio of length to width 2:1), 3.1–4.5 cm. long (average length 3.6 cm.), 1.3–2.3 cm. wide (average width 1.8 cm.), acute, cuneate and oblique at base, very inconspicuously crenate toward apex, concolorous, sparingly and minutely strigillose on both sides, the hairs two cells long, sparingly ciliate with longer hairs, the primary veins 4 pairs; flowers solitary, axillary, ebracteate; pedicels 2.5–2.8 cm. long, thickened toward apex, strigose with reddish hairs; calyx lobes red at apex, greenish at base, erect, equal, free, ovate, 14 mm. long (10–12 mm. teste Urban), 5–7 mm. wide, acute, broadest near base, entire or with 1 or 2 minute glandular denticulations, bearing a few, minute, appressed hairs externally, glabrous within, ciliate with longer, many-celled, reddish hairs; corolla yellow, the tube with red lines, erect in calyx, slightly gibbous at posterior base, 2.8–3 cm. long, the tube about 3 mm. wide above base, 2–2.3 cm. long, tubular, very gradually enlarged to throat, this about 5 mm. wide, minutely puberulous externally, the limb about 9 mm. long, subregular, about 1 cm. wide, the 2 posterior lobes connate for 6–7 mm., the free parts about 2 mm. long, rounded, the lateral lobes connate to posterior for about 4 mm., the free parts about 4 mm. long and broad, the anterior lobe erect, oblong, about 9 mm. long, 3 mm. wide, all lobes pilosulous externally, glandular-pilosulous within; filaments glabrous; anthers quadrate, about 1 mm. long and broad; ovary glabrous except for few hairs at apex; style glandular-pilosulous; disk gland posterior, glabrous, entire.

Type from Springfield, St. Elizabeth Parish, Jamaica, *Wullschlaegel* 1290 (not seen).

SPECIMENS EXAMINED:

JAMAICA: Without special locality, *Purdie* (G). Bluefields Mountain, Westmoreland Parish, *Britton & Hollick* 1964 (F, NY); *Harris* 10200 (F, NY, US). Woodstock, Westmoreland Parish, alt. 420 meters, *Harris* 9836 (F, NY, US); *Britton* 1571 (NY, US).

The range of this distinctive species is evidently restricted. All the known localities are within a few miles of each other in southern Westmoreland and adjacent St. Elizabeth Parish.

2. Columnea sanguinea (Pers.) Hanst. Linnaea **34**: 384. 1865.
Besleria sanguinea Pers. Syn. Pl. **2**: 165. 1807.
Dalbergaria phoenicea DeTussac, Fl. Antill. **1**: 141. *pl. 19.* 1808. Type from Hispaniola, *DeTussac.*

Alloplectus sanguineus Mart. Nov. Gen. & Sp. **3**: 57. 1829.

?Collandra picta Kl. & Hanst. in Otto & Dietr. Allg. Gartenz. **22**: 162. 1854, non Lem. (1852). Based on cultivated material of unknown origin. [2]

Collandra phoenicea Don in Loud. Encycl. Pl. Suppl. **2**: 1402. 1855.

Scandent shrub up to 1.5 meters long, the stems up to 7 mm. in diameter, densely long-hirsute; leaves opposite, the pairs very unequal; larger leaves of a pair subsessile (the petiole 2–8 mm. long), the blades oblong-lanceolate, 11–24 cm. long, 3.5–8 cm. wide, sharply acuminate, strongly oblique and unequal at base, membranaceous when dry, sharply serrate, hirsute on both sides, red-spotted beneath above the middle (sometimes obscurely so), the primary veins 6–8 pairs; smaller leaf of a pair stipule-like, sessile, lanceolate, 2–4 cm. long, 1–1.7 cm. wide, long-acuminate, strongly unequal at base, hirsute on both sides; flowers axillary, 2 or 3 in an axil, subsessile or short-pedicellate (up to 5 mm.); flowering calyx about 2 cm. long, the lobes entirely free, equal, erect, lanceolate, long-hirsute on both sides, subulate-toothed, the teeth long and narrow, about 4 on each side; corolla pale yellow, 2–2.2 cm. long, erect in calyx, a little saccate at posterior base but not spurred, the tube slightly ventricose in the middle, becoming about 5 mm. wide, contracted a little in throat, this 4 mm. wide, the limb small, about 5 mm. wide, the lobes subequal, about 3 mm. long; filaments connate at base, contorted, sparsely pilosulous; anthers connate in pairs, quadrate, about 2 mm. long and wide, the cells oblong, contiguous, not confluent; style thick, included, glabrous; ovary sparsely villous, conic, 5 mm. long; disk reduced to a posterior gland, this thick, about 2 mm. high, 4-dentate at apex, glabrous.

Type from the Dominican Republic, *Turpin* (not seen).

SPECIMENS EXAMINED:

HAITI: Mount Maleuve, alt. 780 meters, *Nash & Taylor* 1167 (F, Mo, NY, US). Port Margot, Morne Brigand, Massif du Nord, alt. 400 meters, *Ekman* H. 2635 (US).

DOMINICAN REPUBLIC: Maniel, near Barahona, alt. 600 meters, *von Tuerckheim* 2816 (NY); *Fuertes* 705 (US). Vicinity of Laguna, Samaná Peninsula, *Abbott* 256 (NY, US), 405 (US). Old Heart River (Jato Viejo), Samaná Peninsula, *Abbott* 1361 (US). Paradis, Prov. Barahona, *Abbott* 1629 (US). Lagunas de Cenoví, Prov. Monte Cristi, alt. 1,100 meters, *Valeur* 64 (US). Loma Bajita, Prov. Santiago, alt. 700–800 meters, *Valeur* 1008 (Mo, NY).

2a. Columnea sanguinea var. **trinitensis** Morton, var. nov.

Folia majora oblongo-oblanceolata, 15–26 cm. longa, 5–10.3 cm. lata; corolla 2.6–3 cm. longa.

Differs from the typical form of the species in its larger and relatively somewhat broader leaf blades, and especially in its larger corolla, this 2.6–3 cm. long, the tube 9 mm. wide at middle, 7 mm. wide in throat, the limb about 7 mm. in diameter, the 3 anterior lobes 3.5 mm. long, connate at base for about 1.5 mm., about 2 mm. wide at base, the two posterior lobes free, about 4 mm. long and 3 mm. wide at base.

Type in the New York Botanical Garden, collected on Guayaguayare Road, Ortoire River, Trinidad, March 25, 1921, by Britton, Freeman, and Nowell (No. 2528). Isotypes in the Gray Herbarium and the National Herbarium.

[2] In this same volume this plant is referred to without description on three other pages, each time under a different generic name. On page 93 it appears as *Colleria picta*, on page 103 as *Kohleria picta*, and on page 118 as *Collania picta*. These are all errors for *Collandra picta*.

ADDITIONAL SPECIMENS EXAMINED:

TRINIDAD: Mount Tocuche, *Britton, Hazen, & Mendelson* 1333 (G, NY, US). Blanchisseuse Road, Hombersleys Trace, *Broadway* 5977 (F, Mo, US). Mora Forest via Sangre Grande, *Broadway* 5386 (F, Mo). Long Stretch, 25–26 mile posts, *Broadway* 6851 (F, Mo, US). Heights of Aripo, *Broadway* 9855 (G, NY, US).

The plant cited by Urban as *C. sanguinea* from Tobago (Morne d'Or, *Eggers* 5856) probably belongs to this variety. I have not seen it.

This geographic variety is rather weakly characterized by its larger corollas and somewhat larger and relatively broader leaves. A measurement of 50 leaves of each variety gives the following figures:

Typical form from Hispaniola: Average width 5.5 cm. (minimum 3.5, maximum 8 cm.); average length 17.4 cm. (minimum 11 cm., maximum 24 cm.); average ratio of length to width 2.8 : 1.

Var. *trinitensis:* Average width 7.27 (minimum 5 cm., maximum 10.3 cm.); average length 20 cm. (minimum 15 cm., maximum 26 cm.); average ratio of length to width 3.1 : 1.

3. Columnea cubensis (Urban) Britton, Torreya **5**: 215. 1906.

Columnea sanguinea sensu Griseb. Cat. Pl. Cub. 201. 1866, non Hanst.

Columnea sanguinea var. *cubensis* Urban, Symb. Antill. **2**: 359. 1901.

Stems unbranched, up to 60 cm. long, 6–7 mm. in diameter, densely hirsute; leaves of a pair very unequal; larger leaf blades short-petiolate, the petiole 7–11 mm. long, hirsute, the blades oblanceolate (ratio of length to width 3 : 1), 16–26 cm. long (average length 21 cm.), 5–8.5 cm. wide (average width 7 cm.), abruptly short-acuminate, very oblique and unequal at base, the upper base cuneate, the lower subcordate, membranaceous when dry, deep green above, paler beneath, not red-spotted beneath, low-crenate, pilose above, appressed-hirsute beneath, the primary veins 8 or 9 pairs; smaller leaf blades stipule-like, up to 3 cm. long and 1.2 cm. wide, sessile, overlapping the stem, subcordate and oblique at base, long-acuminate, hirsute on both sides; flowers 2 or 3 in an axil, subsessile, apparently ebracteate; calyx lobes green, free, erect, equal, lanceolate, about 15 mm. long, 2.5–3 mm. wide (excluding teeth), long-attenuate, subulate-toothed (the teeth about 4 to a side, up to 3 mm. long), long-hirsute on both sides, especially without, the hairs brownish; corolla yellowish white, about 2 cm. long, erect in calyx, a little gibbous at posterior base, the tube subcylindric, about 4 mm. wide at base, becoming 7 mm. wide at middle, densely hirsute externally, glabrous and eglandular within, gradually somewhat contracted to throat, this about 5 mm. wide, the limb small, regular, narrow, the lobes suborbicular, about 2 mm. long, rounded, erect, subequal, glabrous and eglandular within; filaments connate at base for 4 mm., glabrous; anthers quadrate, about 1.5 mm. long and wide, connate; ovary and style hirsute; disk reduced to a glabrous, 3-dentate, posterior gland.

Type from Monte Verde, Oriente, Cuba, *Wright* 357 (isotypes G, Mo).

ADDITIONAL SPECIMENS EXAMINED:

CUBA (Oriente): La Perla, *Shafer* 8523 (NY). Firmeza to Gran Piedra, *Shafer* 8979 (NY). Loma del Gato, *Clément* 596 (NY). El Yunque, *Underwood & Earle* 869 (G, NY). Las Ninfas, *Hioram & Batiste* 1567 (NY). Navas to Camp Buena Vista, *Shafer* 4435 (F, NY, US). Sierra Nipe, *Morton & Acuña* 3230 (US); *Shafer* 3197 (F, NY, US), 3841 (NY, US). Northern slopes of Sierra Maestra, above Río Yao, *Morton & Acuña* 3425 (US).

4. Columnea rutilans Swartz, Prodr. Veg. Ind. Occ. 94. 1788.

Scandent unbranched shrub, the stems gray, terete, up to 7 mm. in diameter, the internodes often very short (0.7–3 cm. long), the old stems sparingly strigose, the young stems densely sericeous-substrigose or subtomentose, the hairs reddish,

the leaf scars very prominent; leaves opposite, those of a pair very unequal, the larger petiolate, the petiole 1.5–2.5 cm. long, densely red-sericeous; larger leaf blades narrowly lanceolate (ratio of length to width 3.6:1), more or less unsymmetrical, 8–17 cm. long (average length 13.3 cm.), 2.4–4.5 cm. wide (average width 3.7 cm.), long-acuminate, the base cuneate, or rounded on one side, strongly oblique and unequal, minutely and inconspicuously denticulate, strigillose above, the under surface red all over, closely and densely sericeous-strigose, the primary veins 6 or 7 pairs, prominent on the lower surface, the secondaries very inconspicuous; smaller leaf blades caducous, short-petiolate (about 3 mm.), the blades 2.5–4.5 cm. long, acuminate, rounded and oblique at base; flowers one to three in each leaf axil, apparently ebracteate, the peduncle 05–2 cm. long, densely red-sericeous-strigose; calyx red, covered on both sides with long red hairs, the lobes free to base, oblong, about 2.5 cm. long in flower, the posterior lobe shorter, about 2 cm. long, all erect, conspicuously laciniate-toothed below middle, the teeth oblong, up to 8 mm. long and 2 mm. wide, the apex of sepal rounded, inconspicuously crenate-dentate; fruiting sepals becoming 3.5 cm. long; corolla yellow with conspicuous red spots and lines within, 4.5–5 cm. long, erect in calyx, the posterior base saccate (3 mm.), the tube 5–6 mm. wide just above base, about 1.8 cm. long, the limb strongly bilabiate, the galea about 3 cm. long, 1.2 cm. wide in free part, deeply 2-lobed at apex, the lobes about 5 mm. long, the lateral lobes connate with galea for about 1.5 cm., the free parts triangular-oblong, ascending, about 1.5 cm. long and 0.8 cm. wide at base, the anterior lobe narrowly oblong, reflexed, about 2.2 cm. long, and 6 mm. wide; corolla tube densely sericeous outside, glabrous within, the lobes strigose outside, glandular-pilosulous within, ciliate; filaments connate at base for about 4 mm., glabrous, not contorted; anthers persistently connate in pairs, oblong, 3.5 mm. long, 2 mm. wide, the loculi narrowly oblong; ovary oblong, densely sericeous; style glandular-pilosulous; stigma stomatomorphic; disk gland posterior, glabrous, 1.5 mm. long, 3-denticulate at apex.

Type from Jamaica, *Swartz* (not seen).

SPECIMENS EXAMINED:

JAMAICA: Near Troy, Trelawny Parish, alt. 600 meters, *Harris* 8528 (NY), 8696 (NY), 9370 (NY); *Maxon* 2852 (NY, US). Dolphin Head, Hanover Parish, *Harris* 9265 (F, NY, US); *Britton* 2305 (NY). Peckham Woods, Clarendon, alt. 750 meters, *Harris* 11092 (NY, US).

5. Columnea subcordata Morton, sp. nov.

?*Columnea hirsuta* f. *wullschlaegelii* Urban, Symb. Antill. **2:** 362. 1901. Type from Manchester, Jamaica, *Wullshlaegel* 959, not seen.

Folia inaequalia; lamina foliorum majorum oblonga, acuta, basi subcordata, non rubro-maculata, fere integra, utrinque parce hirsuta, venis primariis 5–7-jugis; folia minora subsessilia, suborbicularia vel late ovata; flores axillares, bini vel terni; calyx viridis, bilabiatus, lobis 4 anticis connatis, partibus liberis lanceolatis, acuminatis, integris, lobo postico libero, deflexo, omnibus utrinque hirsutis; corolla flava, externe breviter pilosula, valde bilabiata; filamenta pilosula; antherae oblongae; ovarium sericeum; discus in glandulam posticam bilobam glabram reductus.

Scandent shrub, the stems not branched, about 6 mm. in diameter, sparsely hirsute, the hairs long, few-celled; leaves unequal, very short-petiolate, the petiole 3–10 mm. long, long-hirsute; larger leaf blades of a pair oblong, 8.3–13 cm. long, 4.3–5.6 cm. wide, abruptly short-acute, subcordate and oblique at base, concolorous, not red-spotted, nearly entire, sparsely hirsute on both sides, the hairs hyaline, straight, 4- or 5-celled, the primary veins 5–7 pairs, not prominent; smaller leaf blades subsessile, suborbicular or broadly ovate, 3–3.5 cm. long, 2.5–2.7 cm.

wide, scarcely acute, subcordate at base; flowers axillary, 2 or 3 in an axil, the pedicels 1.5–2.2 cm. long, long-hirsute; calyx green, 2 cm. long in flower, bilabiate, the 4 anterior lobes connate for about 6 mm., the free parts lanceolate, about 3.5 mm. wide, acuminate, entire, the posterior lobe free, deflexed, about 15 mm. long and 2 mm. wide, all the lobes hirsute on both sides, the hairs white, spreading, many-celled; fruiting calyx accrescent, 2.2–2.5 cm. long; corolla yellow, not lined with red, 4.5–5 cm. long, a little oblique in the calyx, gibbous at posterior base, the tube 3 mm. wide above base, gradually enlarged upwardly, 2.2–2.4 cm. long, short-pilosulous externally, the galea about 2.5 cm. long, 8 mm. broad toward apex, bilobed, the lobes about 2 mm. long, the lateral lobes connate with galea, the free parts oblong, 10–12 mm. long, 4–6 mm. wide, the anterior lobe deflexed, linear-oblong, about 16 mm. long, 3.5–4 mm. wide, all the lobes glandular-pilosulous within; filaments pilosulous, eglandular; anthers oblong, 2 mm. long, 1.5 mm. wide; ovary sericeous; style glandular-pilose; disk reduced to a glabrous, bilobed, posterior gland.

Type in the U. S. National Herbarium, No. 1,479,223, collected on Mount Ridgway Road, Windsor, Parish of Trelawny, Jamaica, April 9, 1931, at 100–150 meters elevation, by Gerrit S. Miller (No. 1556).

It is possible that this may be Urban's *C. hirsuta* forma *wullschlaegelii*, the type of which I have not seen. Urban, however, does not mention the distinctive character of this species, the bilabiate calyx. The four anterior calyx lobes are connate about one-third of their length, and the posterior is free, narrow, and shorter. They are all entire. In *C. hirsuta* the sepals are all free, subequal, and conspicuously subulate-toothed. The corolla of *C. subcordata* is apparently pure yellow, not brilliant scarlet and yellow as in *C. hirsuta*. The leaves also are different, those of *C. subcordata* being larger (average length 11.4 cm., average width 5.1 cm., compared to *C. hirsuta*, average length 7.5 cm., average width 3.4 cm.) and more strongly cordate at base. The hairs are long, as in *C. hirsuta*, but have fewer cells. The two species occupy different habitats, *C. subcordata* being found near sea level in the northwestern part of the island and *C. hirsuta* being confined to higher elevations of the Blue Mountains.

Even if Urban's f. *wullschlaegelii* were known to be the same, it would be inadvisable to adopt that epithet for the species, because of the existence of *C. wullschlaegeliana* Hanst., also from Jamaica.

6. **Columnea hirsuta** Swartz, Prodr. Veg. Ind. Occ. 94. 1788.

Columnea hirsuta var. *genuina* Urban, Symb. Antill. **2**: 361. 1901.

Columnea hirsuta var. *pallescens* Urban, op. cit. 362. Type from St. Catherines Peak, parish of St. Andrew, Jamaica, alt. 1,400 meters, *Eggers* 3663 (isotype US).

Columnea hirsuta var. *concolor* Urban, loc. cit. Type from near Cinchona, parish of St. Andrew, Jamaica, alt. 1,600 meters, *Fawcett* 6366 (isotypes F, NY).

Scandent shrub up to 5 meters long, sparingly branched, the branchlets up to 6 mm. thick, densely long-hirsute, the hairs flaccid, many-celled; leaves of a pair unequal, the larger petiolate, the petiole up to 1.5 cm. long, hirsute; larger leaf blades oblong (average ratio of length to width 2.2:1), 4.8–12 cm. long (average length 7.5 cm.), 2.4–5.4 cm. wide (average width 3.4 cm.), rounded or broadly cuneate at base, oblique, acute or short-acuminate, inconspicuously crenate-denticulate, concolorous, not red-spotted beneath, hirsute on both sides, the hairs long, flaccid, about 8 cells long, the primary veins 5 or 6 pairs; smaller leaves short-petiolate (up to 5 mm.), ovate or suborbicular, 2.5–6 cm. long, 1.8–3.5 cm. wide, acute, slightly toothed; flowers 1 to 3 in each axil; peduncle about 1.5 cm. long, densely long-hirsute; calyx commonly red or reddish, the lobes

free to base, linear-attenuate, 2.7–4 cm. long in flower, 4 mm. wide near base, long-hirsute on both sides, remotely spinulose-denticulate, the teeth 1 or 2 on each side, subulate, 0.5–2 mm. long, ca. 0.4–1 mm. wide; corolla yellow with red stripes within, 4.3–5.5 cm. long, the posterior base saccate (4 mm.), the tube 4 mm. wide above base, 2.2 cm. long, densely sericeous outside, glabrate within, the galea about 2.8 cm. long, the free part about 1 cm. wide, deeply bilobed at apex, the lobes about 5 mm. long, the lateral lobes connate with galea for about 13 mm., the free parts linear-oblong, about 14 mm. long and 4.5 mm. wide, all the lobes sericeous outside, ciliate, glandular-pilosulous within; filaments connate at base for 6 mm., pilosulous above (the hairs eglandular); anthers connate in pairs, 2.5 mm. long, 2 mm. wide, the loculi parallel, slightly unequal; ovary oblong, densely sericeous; style densely glandular-pilosulous; stigma stomatomorphic; disk gland posterior, glabrous, 1.5 mm. long, deeply bilobed.

Type from Jamaica, *Swartz* (not seen).

SPECIMENS EXAMINED:

JAMAICA (St. Andrew Parish): Morces Gap to Vinegar Hill, alt. 1,175–1,500 meters, *Maxon & Killip* 694 (F, G, NY, US). Morces Gap, alt. 1,500 meters, *Maxon & Killip* 1722 (F, G, NY, US); *Nichols* 15 (F, G, Mo, NY, US). Cinchona, *Harris & Lawrence* C15158 (US). Cinchona to New Haven Gap, *Britton* 133 (NY). Near Mabess River, alt. 780 meters, *Harris* 9123 (NY). Lower eastern ridge of Mossmans Peak, alt. 1,600–1,700 meters, *Maxon* 9665 (US). Near St. Helens Gap, alt. 1,475 meters, *Maxon & Killip* 591 (US). Slopes above Tweedside, alt. 900 meters, *Maxon* 966. Blue Mountain Peak, *A. S. Hitchcock* (Mo).

Urban's varieties *pallescens* and *concolor* do not differ materially from typical specimens.

7. Columnea fawcettii (Urban) Morton, comb. nov.

Columnea hirsuta var. *fawcettii* Urban, Symb. Antill. **2**: 363. 1901.

Scandent shrub, sparingly branched, the branchlets about 5 mm. thick, all except the youngest glabrate, these substrigose with short few-celled hairs; leaves of a pair unequal or subequal, rather long-petiolate, the petiole up to 17 mm. long, strigose; larger leaf blades oblong (average ratio of length to width 2.4:1), 6–10.5 cm. long (average length 8 cm.), 2.3–4.5 cm. wide (average width 3.3 cm.), short-acuminate, broadly cuneate and oblique at base, subcoriaceous, very remotely crenate-denticulate, short-strigillose on both sides, the primary veins 4 or 5 pairs; smaller leaf blades conform, subequal or much reduced and then only 3.5 cm. long and 1.9 cm. wide; flowers 1 to 3 in a leaf axil; pedicels 12–15 mm. long, densely hirsute; calyx red, densely hirsute on both sides, the lobes linear, 1.8–3 cm. long, acuminate, remotely spinulose-toothed, the teeth 2 or 3 (or 5?) to a side, subulate, 1–2 mm. long; corolla erect in calyx, red with yellow lines, 4.5–5.3 cm. long (rarely only 4 cm.), gibbous at posterior base, the tube about 4 mm. wide above base, about 1.8 cm. long, densely sericeous outside, glabrous within, the galea about 3 cm. long, the free part about 8 mm. wide, deeply bilobed, the lobes 6 mm. long, the lateral lobes connate with galea for about 1.5 cm., the free parts linear-oblong, 2 cm. long and 3.5 mm. wide, all the lobes sericeous outside, ciliate, glandular-pilosulous within; filaments pilosulous; anthers connate in pairs, 1.8 mm. long, 1.5 mm. wide; ovary densely sericeous; style glandular-pilosulous; disk reduced to a posterior bilobed, glabrous gland.

Type from Browns Town, St. Ann Parish, Jamaica, *Fawcett* 6587 (not seen).

SPECIMENS EXAMINED:

JAMAICA: Upper slopes of Mount Diablo, St. Catherine Parish, alt. 500–800 meters, *Maxon & Killip* 429 (F, G, NY, US); *Hunnewell & Griscom* s. n. (G).

Soho, St. Ann Parish, alt. 420 meters, *Harris* 11993 (NY, US). Hollymount, St. Catherine Parish, alt. 750 meters, *Britton* 757 (NY); *Maxon* 2334 (US); *Harris* 8896 (NY). Union Hill, near Moneague, St. Ann Parish, *Britton & Hollick* 2741 (NY). Grierfield, near Moneague, St. Ann Parish, *Britton* 2659 (NY). Vicinity of Millbank, Portland, alt. 200–300 meters, *Maxon & Killip* 133 (F, G, NY, US). Seamens Valley, Portland, alt. 150–250 meters, *Maxon & Killip* 81 (F, G, NY, US). John Crow Mountains, alt. 350–780 meters, *Britton* 3936 (NY), 4172 (NY); *Harris & Britton* 10700 (F, NY). Ridge east of Cuna Cuna Gap, St. Thomas Parish, alt. 750–840 meters, *Maxon* 9407 (G, US). Upper southern slopes of Maccasucker Bump, St. Thomas Parish, alt. 825–1,025 meters, *Maxon* 9523 (US).

At the time Urban described this plant as a variety of *C. hirsuta* he had a single specimen only. The abundant material now available shows that the two are specifically distinct. The upper leaf surface in *C. hirsuta* is truly hirsute, the hairs being long, flaccid, spreading, and 5–8-celled. In *C. fawcettii* the upper leaf surface is minutely and sparsely strigillose, the hairs being appressed and uniformly composed of only two cells—a short, hyaline basal cell and a bayonet-shaped, usually whitish, terminal cell. *C. fawcettii* is found in the parishes of St. Thomas, Portland, St. Ann, and adjacent St. Catherine, at relatively low elevations (150 to perhaps 1,000 meters), whereas *C. hirsuta* is confined to higher elevations in the Blue Mountains of the parish of St. Andrew.

8. Columnea brevipila Urban, Symb. Antill. **6**: 41. 1909.

Scandent shrub several feet long, the stems probably unbranched, 5–10 mm. thick, glabrous and shining, the young stems minutely and sparsely strigillose, the internodes short; leaves of a pair subequal, petiolate, the petiole 0.5–1 cm. long, strigillose; leaf blades oblong (ratio of length to width 2.4–2.8:1), 5–11 cm. long, 2.1–5 cm. wide, short-acuminate, cuneate at base, subcoriaceous, concolorous, not red-spotted, remotely and minutely crenulate-denticulate, minutely and sparsely strigillose on both sides, the hairs 2-celled, the terminal cell white, the primary veins 5 or 6 pairs; flowers 1–5 in an axil; pedicels 1.2–2 cm. long, strigillose, thickened at apex, subtended by two linear-lanceolate, green bracts, these 12–15 mm. long, entire, caducous; calyx green, the lobes all free, subequal, linear-lanceolate, 2–3 cm. long. 3.5–5 mm. wide, minutely strigillose on both sides, entire; corolla 4.5–5 cm. long, yellow, erect in calyx, gibbous at posterior base, the tube about 3 mm. wide above base, about 25 mm. long, sericeous-strigose externally, glabrous within, the galea about 2 cm. long, the free part 5–6 mm. wide, bilobed at apex (2 mm.), the lateral lobes connate with galea for 9 mm., the free part oblong, about 12 mm. long, 3.5–5 mm. wide, the anterior lobe reflexed, about 15 mm. long and 4 mm. wide, all sericeous outside, glandular-pilosulous within; filaments glabrous; anthers connate in pairs, about 2 mm. long, 1.5 mm. wide; style glandular-pilosulous.

Type from Kentucky Hill, Bluefields Mountains, Westmoreland Parish, Jamaica, alt. 600–750 meters, *Harris* 10199 (isotypes F, NY, US).

ADDITIONAL SPECIMEN EXAMINED:

JAMAICA: Bluefields Mountains, alt. 650 meters, *Britton & Hollick* 1953 (NY).

9. Columnea argentea Griseb. Fl. Brit. W. Ind. 465. 1861.

Columnea wullschlaegeliana Hanst. Linnaea **34**: 414. 1865. Type from Jamaica, *Wullschlaegel* 960.

Scandent shrub, 80 cm. long, probably unbranched, the stems very thick (about 9 mm. diam.), white-sericeous at apex, the internodes short, the leaf scars very large; leaves of a pair probably equal or subequal, short-petiolate, the petiole 0.4–1 cm. long, white-sericeous; leaf blades oblong-lanceolate (ratio of length to

width 3.4–3.7 : 1), 7.5–13 cm. long. 2.5–3.5 cm. wide, acuminate, rounded at base, concolorous, not red-spotted, remotely and very inconspicuously denticulate, soft sericeous-strigose on both sides, the hairs 4- or 5-celled, hyaline, the primary veins 4 or 5 pairs; flowers 1–3 in an axil; pedicels 5–7 (16?) mm. long, densely white-sericeous; calyx lobes equal, erect, densely white-sericeous on both sides, oblong-linear, about 2 cm. long and 4 mm. broad in flower, acuminate, entire; corolla pale yellow, about 5 cm. long, erect in calyx, the tube about 3 cm. long, densely white-sericeous outside, the galea about 2 cm. long, about 7.5 mm. wide in the free part, shortly bilobed at apex (about 1 mm.), the lateral lobes connate with galea for about 9 mm., the free parts narrowly oblong, about 16 mm. long and 3 mm. wide, the anterior lobe reflexed, oblong-linear, 18 mm. long, 2.5 mm. wide, all lobes densely white-sericeous outside, glandular-pilosulous within; filaments glabrous; style glandular-pilosulous.

Type from Nazareth, Manchester Parish, Jamaica, *Wullschlaegel* (not seen).

SPECIMEN EXAMINED:

JAMAICA: New Green, Manchester Parish, *Britton* 3755 (NY).

10. Columnea harrisii (Urban) Britton in herb.

Columnea hirsuta f. *harrisii* Urban, Symb. Antill. **2**: 363. 1901.

?*Columnea hirsuta* f. *hansenii* Urban, loc. cit. Type from Jamaica, *Hansen*, presumably at Berlin.

Frutex; folia inaequalia; lamina foliorum majorum oblonga, apice acuta vel breviter acuminata, basi rotundata vel late cuneata, remote denticulata, non rubro-maculata, utrinque sericeo-strigosa, pilis 3–5-cellularibus; calyx viridis, lobis lineari-lanceolatis, aequalibus, acuminatis, integris, utrinque sericeo-strigosis; corolla lutea et rubra, valde bilabiata, lobis intus glanduloso-pilosulis; filamenta glabra; ovarium sericeum.

Unbranched shrub, the stems ridged, about 5 mm. in diameter, shortly but densely hirsute toward apex, the internodes short; leaves of a pair unequal, the larger short-petiolate, the petiole 3–8 mm. long, short-hirsute; larger leaf blades oblong (ratio of length to width 2.7 : 1), 7.5–13 cm. long (average length of 30 leaves 10.5 cm.), 2.4–5.2 cm. wide (average width 3.9 cm.), acute or short-acuminate, rounded or broadly cuneate at base, oblique, remotely and inconspicuously denticulate, concolorous, not red-spotted, sericeous-strigose on both sides, the hairs hyaline, of 3–5 cells, subtortuous, the primary veins 7 or 8 pairs; smaller leaves very short-petiolate (1–2 mm.), the blades broadly ovate, 2.5–4.5 cm. long, 1.6–2.3 cm. broad, acute, crenulate; flowers 1–3 in each axil; pedicels about 1 cm. long, shortly and densely hirsute with hyaline, colorless hairs; calyx green, densely sericeous-strigose on both sides, the hairs colorless, several-celled, the lobes all free, erect, equal, linear-lanceolate, about 2 cm. long and 4 mm. wide in flower, somewhat accrescent in fruit, acuminate, entire; corolla yellow, sparingly striped with red, 3.8–5 cm. long, suberect in calyx, short-gibbous at posterior base, the tube about 3 mm. wide above base, 2.2 cm. long, white-sericeous outside, glabrous within, the galea about 2.5 cm. long, the free part about 8 mm. wide, bilobed at apex, the lobes 1.5 mm. long, the lateral lobes connate with galea for 1.2 cm., the free part oblong, 13 mm. long, 4.5 mm. wide, all the lobes sparingly sericeous outside, glandular-pilosulous within; filaments connate at base, glabrous; anthers 1.8–2.1 mm. long, 1.2 mm. wide, connate in pairs; ovary sericeous; style glandular-pilosulous; disk reduced to a bilobed, glabrous, posterior gland.

Type from Belvedere, Hanover Parish, Jamaica, alt. 160 meters, *Harris* 7522 (isotype NY).

SPECIMENS EXAMINED:

JAMAICA: Belvedere, Hanover Parish, *Fawcett* 8480 (F, NY). Kempshot, Hanover Parish, *Britton* 2438 (F, NY, US). Newmarket, Westmoreland Parish, *Britton* 1576 (NY).

This plant may not be regarded as a variety of *C. hirsuta*, as Urban referred it. It is distinguished by several important characters as follows:

Filaments glabrous; calyx lobes entire, sericeous; leaves appressed-sericeous, the hairs about 5 cells long; veins 7 or 8 pairs_____ **C. harrisii**
Filaments obviously pilosulous; calyx lobes subulate-toothed, long-hirsute; leaves hirsute, the hairs about 8 cells long; veins 5 or 6 pairs_____ **C. hirsuta**

These two species occupy different ranges in Jamaica. *Columnea harrisii* occurs near sea level in the two westernmost parishes, whereas *C. hirsuta* is found at the higher elevations of the Blue Mountains in eastern Jamaica.

11. Columnea tincta Griseb. Mem. Amer. Acad. n. ser. **8**: 526. 1863.

Scandent shrub, sparingly branched, the branches 4–5 mm. thick, sparingly hirsute at apex, glabrous below, the internodes short; leaves of a pair subequal or unequal, petiolate, the petiole up to about 15 mm. long, sparingly hirsute; leaf blades oblong or oblanceolate (average ratio of length to width 2.1 : 1), 5.8–10 cm. long (average length 8 cm.), 2.2–4.5 cm. wide (average width 3.8 cm.), acute or rarely (abnormally?) rounded at apex, cuneate or slightly rounded at base, subcoriaceous or membranaceous, concolorous, not red-spotted, remotely denticulate, strigose on both sides, the hairs minute, appressed, intermixed with long scattered spreading hairs (these often deciduous), the primary veins 4 pairs; flowers 1 to 3 in an axil; pedicels 10–18 mm. long, hirsute, subtended by 2 lanceolate bracts about 8 mm. long, these caducous; calyx crimson, the lobes free, erect, subequal, linear-oblong, 13–20 mm. long, 4 mm. wide, acute, remotely glandular-denticulate (the teeth 1 or 2 on each side), red-hirsute on both sides; corolla yellow, 3.8–4.2 cm. long, erect in calyx, gibbous at posterior base, the tube 4 mm. wide above base, about 2 cm. long, sparsely villous outside, the galea 2.2 cm. long, the free part about 7 mm. wide, bilobed at apex (about 2.5 mm.), the lateral lobes connate to galea for about 13 mm., the free parts triangular-oblong, about 1 cm. long and 5 mm. wide, the anterior lobe reflexed, linear-oblong, about 18 mm. long, 4 mm. wide, all lobes sparingly red-hirsute outside, glandular-pilosulous within; filaments glabrous; anthers connate in pairs, 1.5 mm. long, 1.2 mm. wide; ovary hairy; style glandular-pilosulous; disk reduced to a glabrous, bilobed, posterior gland.

Type from Monte Verde, Oriente, Cuba, *Wright* 358 (isotypes G, Mo).

ADDITIONAL SPECIMENS EXAMINED:

CUBA (Oriente): Monte Verde, *Wright* 1336 (G, Mo). El Yunque, alt. 300–600 meters, *Pollard & Palmer* 171 (NY, US); *Underwood & Earle* 1013 (NY). La Prenda, *Hioram* 4252 (NY). La Perla, *Shafer* 8498 (NY). Río Yamaniguey, *Shafer* 4239 (NY).

12. Columnea tulae Urban, Symb. Antill. **1**: 409. 1899.

Columnea scandens var. *β* L. Sp. Pl. 638. 1753.

Columnea tulae var. *rubra* Urban, Symb. Antill. **1**: 409. 1899.

Columnea tulae var. *flava* Urban, op. cit. 410. Type from near Aybonito, Puerto Rico, *Sintenis* 2694 (isotypes G, Mo, NY, US).

Scandent, epiphytic shrub; stems sparingly branched, 3–5 mm. thick, glabrate below, soft-pilosulous toward apex; leaves of a pair equal or nearly so, short-petiolate, the petiole 0.5–1 cm. long, pilosulous; leaf blades oval (average ratio of length to width 2.5:1), 2.2–4.5 cm. long (average length 3.3 cm.), 0.7–1.8 cm. wide (average width 1.3 cm.), rounded at apex, obliquely cuneate at base, concolorous, not red-spotted, entire, densely soft-pilosulous on both sides, the hairs hyaline, flaccid, subtortuous, 3 or 4 cells long, the primary veins 3 pairs, obscure; flowers solitary, axillary; pedicels 9–11 mm. long, densely white-pilosulous,

bibracteate at base, the bracts lanceolate, about 4 mm. long, entire, white-pilosulous; calyx green, the lobes equal, erect, lanceolate, 10–13 mm. long, 2.5–3 mm. wide, acuminate, narrowed toward base, the 4 anterior connate at base for 1 mm., the posterior free, pilosulous on both sides, the hairs colorless; corolla yellow, orange, or red, 3.5–4.9 cm. long, erect in calyx, very slightly gibbous at posterior base, the tube 2 mm. wide above base, 2.8–3.5 cm. long, very gradually enlarged, about 8 mm. wide in throat, rather sparsely pilosulous externally, glabrous within, the galea 10–14 mm. long, the free part about 7 mm. wide, truncate, not bilobed, the lateral lobes connate with galea for 4–5 mm., the free parts triangular, 6–7 mm. long, 3–4 mm. wide, the anterior lobe reflexed, oblong, about 6 mm. long, 1.5–2 mm. wide, all lobes pilosulous outside, glandular-pilosulous within; filaments bearing a few scattered glands, otherwise glabrous; anthers oblong 1–1.5 mm. long, 0.7–0.9 mm. wide; ovary glabrous; style glandular-pilosulous; stigma bilobed; disk gland posterior, large, glabrous, entire; berry white.

Type from Puerto Rico, *Bertero* 285.

SPECIMENS EXAMINED:

PUERTO RICO: Alto de la Bandera, *Britton & Shafer* 2121 (NY, US); *Cowell* 5489 (NY). Monte de Oro, *Stevens* 5583 (NY). Monte Torrecilla, alt. 900–1,100 meters, *Britton, Cowell, & Brown* 5531 (NY). Cayey, *Kuntze* 421 (NY). Sierra de Naguabo, *Sintenis* 1302 (F, G, Mo, NY, US); *Stevenson* 1562 (US); *Shafer* 3189 (NY, US), 3203 (NY); *Britton & Shafer* 2137 (NY). Mount Mandios, *Britton & Cowell* 945 (NY). Cerro de las Pinas, alt. 600–720 meters, *Britton, Matz & Chardon* 6881 (NY). Cialitos, *Britton & Britton* 7966 (NY). Mount Morales, *Britton & Cowell* 822 (F, NY, US). Sierra Luquillo, *Eggers* 1304 (US); *Heller* 719 (F, NY, US); *Wilson* 85 (NY); *Otero* 577 (F). El Yunque, *Boynton* 8225 (NY); *Sargent* 337 (US). Maricas, *Sintenis* 322 (US). Alto de la Piedra, alt. 750–950 meters, *Britton & Earle* 6089 (NY). Sierra de Yabucoa, alt. 250–550 meters, *Britton, Britton, & Earle* 6305 (NY).

HAITI: Massif de la Hotte, alt. 700 meters, *Ekman* H7592 (US). Massif du Nord, *Ekman* H4331 (US). High mountains southwest of St. Louis du Nord, *Leonard & Leonard* 14495 (US). Mount Maleuvre, *Nash & Taylor* 1147 (NY), 1152 (NY).

13. Columnea tocoensis Britton, Bull. Torrey Club **53**: 470. 1926.

Scandent, epiphytic shrub, the stems more or less branched, about 30 cm. long, 2–3 mm. thick, densely sericeous-strigose toward apex; leaves of a pair equal or nearly so, petiolate, the petiole 3–5 mm. long, strigose; leaf blades narrowly oblong (average ratio of length to width 3.4 : 1), 1.8–4.1 cm. long (average length 3.1 cm.), 0.7–1.3 cm. wide (average width 0.9 cm.), rounded at apex, cuneate at base, concolorous, not red-spotted, entire, subcoriaceous, softly appressed-pilosulous on both sides, the hairs 3- or 4-celled, the primary veins 3 pairs, very inconspicuous; flowers solitary, axillary; pedicels 5–6 mm. long, densely sericeous, subtended by 2 small, lanceolate, entire bracts; calyx green, the lobes erect, subequal, the 4 anterior connate at base for about 1 mm., the posterior nearly free, linear-lanceolate, narrowed toward base, 7–10 mm. long, 1.8–2.2 mm. wide, acuminate, entire, herbaceous, white-sericeous on both sides, especially at outer base; corolla yellow, not marked with red, 4–4.8 cm. long, erect in calyx, slightly gibbous at posterior base, the tube about 2 mm. broad above base, 2.4–3 cm. long, sparsely pilosulous externally with hyaline, colorless hairs, gradually ampliate to throat, this about 5 mm. wide, the galea 16–18 mm. long, the free part 5–6 mm. wide, acute at apex, not at all lobed or emarginate, the lateral lobes connate to galea about 7 mm., the free parts triangular, about 6 mm. long and 4 broad, the anterior lobe reflexed, narrowly oblong, about 11 mm. long, 2.5 mm. wide, all lobes sparsely pilosulous outside, glandular-pilosulous within; filaments glabrous; anthers

narrowly oblong, 1.5 mm. long, about 0.75 mm. wide; ovary sparsely sericeous at apex; style glandular-pilosulous; stigma 2-lobed; disk reduced to a glabrous, entire, posterior gland.

Type from Toco Road, Valencia, Trinidad, *Britton, Hazen, & Mendelson* 1785 (NY; isotypes G, US).

ADDITIONAL SPECIMENS EXAMINED:

TRINIDAD: Caroni River, south of Arima, *Britton & Britton* 2886 (NY, US). Oropuche, Valencia, *Broadway* 6176 (Mo), s. n. (F). Arena, *Broadway* s. n. (F, Mo). Cumuto, *Broadway* 5741 (F, Mo).

14. Columnea scandens L. Sp. Pl. 638. 1753.

Glycanthes scandens Raf. Sylv. Tellur. 83. 1838.

Columnea jacquiniana Presl, Bot. Bemerk. 146. 1844.

Scandent, epiphytic shrub, rooting at the nodes, sparingly branched, the stems 3–4 mm. in diameter, glabrate below, sericeous-strigose toward apex; leaves of a pair equal, short-petiolate, the petiole 4–5 mm. long, densely strigose; leaf blades broadly ovate to almost suborbicular (average ratio of length to width 1.5 : 1), 2.3–4 cm. long (average length 3.1 cm.), 1.5–2.4 cm. wide (average width 2.3 cm.), rounded at apex, obtuse or rounded at base, thick-chartaceous when dry, concolorous, rather obscurely crenate-dentate above middle, strigose on both sides, the hairs 2- or 3-celled, the primary veins 3 or 4 pairs, impressed beneath; flowers solitary, axillary; pedicels 8–11 mm. long, densely sericeous; calyx green, the lobes erect, subequal, nearly free, linear-lanceolate, 11–13 mm. long, 2–3.5 mm. wide, long-acuminate, narrowed toward base, entire, or the 3 posterior with a single tooth near base, all lobes strigose on both sides; corolla red, erect in calyx, 5–5.7 cm. long, a little gibbous at posterior base, the tube about 3.5 mm. wide above base, 2.8–3 cm. long, sparsely pilosulous externally, gradually widened to throat, this 8–9 mm. wide, the free part of galea 12–13 mm. wide, acute, the lateral lobes connate to galea for 9–11 mm., the free parts triangular, about 5 mm. long and broad, the anterior lobe reflexed, narrowly oblong, 14–15 mm. long, 3–4 mm. wide, all lobes sparsely pilosulous outside, glandular-pilosulous within; filaments glabrous; anthers narrowly oblong, 1.5 mm. long, 0.8 mm. wide; ovary hairy at apex; style glandular-pilosulous; stigma deeply bilobed; disk gland posterior glabrous, entire.

Type from Martinique, *Plumier*.

SPECIMENS EXAMINED:

MARTINIQUE: Deux-Choux, alt. 560–800 meters, *Duss* 1876 (NY), 4637 (NY, US).

MONTSERRAT: Blake Mountain, *Shafer* 489 (NY). Pond Mountain, *Shafer* 546 (F, NY, US).

The specimens from Montserrat are not exactly like those from Martinique, having somewhat hairier leaves and more prominently toothed calyx lobes.

14a. Columnea scandens var. **vincentina** Morton, var. nov.

Lamina foliorum ovata vel oblonga, obtusa, parce strigillosa, pilis bicellularibus; calycis lobi subaequales, liberi, triangulari-lanceolati, basi perspicue dentati, substrigosi; corolla rubra.

Scandent, epiphytic shrub up to 30 cm. long, the stems sparingly branched, 2–6 mm. in diameter, strigose or subpilosulous at apex, glabrate below; leaves of a pair equal or nearly so, short-petiolate, the petiole 2–7 mm. long, pilosulous; leaf blades ovate to oblong (average ratio of length to width 2.1 : 1), 2.2–4.2 cm. long (average length 2.9 cm.), 1.2–1.9 cm. wide (average width 1.4 cm.), obtuse, obtuse to broadly cuneate at base, subcoriaceous, concolorous, entire or very inconspicuously denticulate, minutely and sparsely strigillose on both sides, the hairs composed of 2 cells only, the primary veins 2 or 3 pairs; flowers solitary,

axillary; pedicels 9–13 mm. long, pilosulous, the hairs often purplish; calyx green, the lobes erect, subequal, all free, triangular-lanceolate, 9–15 mm. long, 4–5 mm. wide, acuminate, slightly narrowed at base, conspicuously toothed below middle, with one or two long and broad teeth, substrigose (especially at base) with long, purplish hairs; corolla bright red, erect in calyx, 4.3–5.6 cm. long, gibbous at posterior base, the tube 3 mm. wide above base, 22–30 mm. long, pilosulous outside (the hairs red), gradually enlarged to throat, this 6–9 mm. wide, the free part of galea 10–11 mm. wide, acutish, the lateral lobes 6–9 mm. long, 3–4 mm. wide, the anterior lobe reflexed, linear, 10–15 mm. long, 2–2.5 mm. wide, all lobes pilosulous externally, glandular-pilosulous within; filaments glabrous; anthers oblong, about 2 mm. long and 1 mm. wide; ovary hairy at apex; style glandular-pilosulous; stigma deeply bilobed; disk gland posterior, glabrous, entire.

Type in the U. S. National Herbarium, No. 1,336,578, collected on Mount St. Andrews, St. Vincent, December 1889, at 600 meters elevation, by Baron Eggers (No. 6698).

ADDITIONAL SPECIMENS EXAMINED:

ST. VINCENT: Without specific locality, *H. H. & G. W. Smith* 16 (NY). Without specific locality or collector, July 1824 (G), perhaps collected by Guilding?.

GRENADA: Mirabeau Mountains, May 26, 1906, *Broadway* (F, G, NY). Grand Etang, *Miller* 127 (US).

14b. Columnea scandens var. aripoensis (Britton) Morton, comb. nov.

?*Columnea rotundifolia* Salisb. Parad. Lond. **1**: *pl. 29*. 1806. Type from Trinidad, *Buchanan*.

?*Columnea speciosa* Presl, Abh. Böhm. Ges. Wiss. V. **3**: 575. 1845. Described from cultivated specimens.

Columnea aripoensis Britton, Bull. Torrey Club **53**: 470. 1926.

Scandent epiphytic shrub, sparingly branched, 15–30 cm. long, the stems densely sericeous toward apex, about 4 mm. in diameter; leaves short-petiolate, the petiole 2–3 mm. long, densely strigose; leaf blades oblong (average ratio of length to width 2.6 :1), 2–3.3 cm. long (average length 2.6 cm.), 0.8–1.5 cm. wide (average width 1 cm.), rounded or obtuse at apex, cuneate at base, entire, concolorous, subcoriaceous, softly and densely strigose on both sides, the hairs 2 or 3 cells long, the primary veins 3 pairs, obscure; flowers solitary, axillary; pedicels 8–15 mm. long, strigose, subtended by two small, lanceolate bracts; calyx green, the lobes subequal, connate at base for about 1 mm. (the posterior lobe nearly free), broadly lanceolate, 10–11 mm. long, 2.5–4 mm. wide, entire or the 3 posterior sometimes with a single short tooth near base, all rather sparingly strigose on both sides; corolla red, 4.6–5.8 cm. long, erect in calyx, slightly gibbous at posterior base, the tube about 2 mm. long above base, 3–3.7 cm. long, rather sparsely pilosulous outside, gradually enlarged to throat, the throat 6–8 mm. broad, the galea 2–2.3 cm. long, the free part 9–10 mm. wide, acute, the lateral lobes connate to galea for about 8 mm., the free parts triangular-oblong, about 8 mm. long and 4 mm. wide, the anterior lobe reflexed, linear, 10–13 mm. long, 2–2.5 mm. wide, all lobes sparsely pilosulous externally, glandular-pilosulous within; filaments glabrous; anthers oblong, 1.5–2 mm. long, 1–1.7 mm. wide; ovary slightly hairy at apex; style glandular-pilosulous; stigma bilobed; disk reduced to a glabrous, entire, posterior gland.

Type from Heights of Aripo, Trinidad, *Britton & Freeman* 2340 (NY).

ADDITIONAL SPECIMENS EXAMINED:

TRINIDAD: North Mountain Range, alt. 600 meters, *Graf* 2 (NY). Heights of Aripo, *Broadway* 9856 (NY). Woods of Ciparia, May 31, 1805, *Trinidad Herb.* 2514 (US).

TOBAGO: Caledonia Woods, *Broadway* 4005 (F).

I have seen the type of Britton's species and believe it wiser to use his epithet as the varietal name than the earlier epithets of Salisbury or Presl, since I am obliged to place these names from description only. Urban identifies these old names with the plant I am calling var. *vincentina*, but the descriptions agree better with *aripoensis*.

Salisbury's specimen was collected in Trinidad before 1806 by Buchanan, no specific locality being mentioned. It is quite possible that the specimen listed above (Woods of Ciparia, May 31, 1805) may be as isotype, for it seems rather unlikely that more than one person found this rare plant in Trinidad at that early time. It has been discovered there only three times in the intervening 139 years.

DOUBTFUL SPECIES

15. COLUMNEA HISPIDA Swartz, Prodr. Veg. Ind. Occ. 94. 1788.

Type from Jamaica, *Swartz*.

From description I am not able to identify this with any of the species known from Jamaica. It is perhaps a valid species, not collected again.

THE WEST INDIAN SPECIES OF ALLOPLECTUS

The most recent treatment of the West Indian species of *Alloplectus* (Gesneriaceae) is that of Urban,[3] wherein the species are merely listed without descriptions or a key. The present treatment recognizes the same species, but three new varieties are described. Full descriptions of the older species have been drawn up from the more abundant material now available, and a key has been prepared.

KEY TO SPECIES

Calyx lobes entire, narrowed at base, hirsute on both sides. Jamaica.
1. A. pubescens

Calyx lobes toothed or laciniate.

Calyx lobes dissimilar, the anterior conspicuously toothed, the posterior one entire; flowers 2 or 3 in an axil; leaves relatively large, 4.2–11.5 cm. long. Puerto Rico ..... **2. A. ambiguus**

Calyx lobes all similar; flowers solitary; leaves small, 1.6–5.5 cm. long.

Style glabrous; corolla throat and lobes eglandular within. Corolla yellow; calyx red, angled; ovary strigose all over. Lesser Antilles.
3. A. cristatus

Style glandular-pilosulous; corolla throat and lobes glandular-pilosulous within.

Sepals glabrous within, green; corolla red with narrow yellow stripes; ovary glabrous. Jamaica ..... **4. A. grisebachianus**

Sepals hairy within, red; corolla yellow; ovary hairy at apex. Hispaniola.
5. A. domingensis

1. Alloplectus pubescens (Griseb.) Fawc. Prov. List Fl. Jam. 28. 1893.

Pterygoloma pubescens Griseb. Flora Brit. W. Ind. 464. 1861.

Columnea pubescens Kuntze, Rev. Gen. Pl. **2**: 472. 1891.

Scandent shrub, the stems sparingly branched, the branchlets 2–2.5 mm. thick, hirsute, the hairs colorless, many-celled; leaves of a pair equal or strongly unequal, petiolate, the petiole 6–17 mm. long, slender, hirsute; larger leaf blades oblong

[3] Symb. Antill. **2**: 356–358. 1901.

(average ratio of length to width 2.4: 1), 4.7–8.4 cm. long (average length 6.6 cm.), 2.2–3.1 cm. wide (average width 2.8 cm.), abruptly short-acuminate, cuneate at base, membranaceous, rather sharply but inconspicuously denticulate, hirsute on both sides, the hairs colorless, many-celled, the primary veins 4 or 5 pairs; smaller leaves short-petiolate (about 5 mm. long), the blades ovate to oblong, often only about 2.5 cm. long; flowers solitary, axillary, ebracteate; pedicels about 13 mm. long, hirsute, the hairs colorless, many-celled; calyx green, the lobes erect, free, oblong-lanceolate, about 11 mm. long, acuminate, narrowed at base, entire, hirsute on both sides, more densely so within, ciliate; corolla yellow (?), about 2.2 cm. long, erect in calyx, the tube about 2 cm. long, about 4 mm. wide at middle, slightly contracted in throat, strigose externally with colorless hairs, the limb about 6 mm. broad, nearly regular, the lobes about 2 mm. long.

Type from Portland, Jamaica, alt. 600 meters, *Wilson* (not seen).

SPECIMENS EXAMINED:

JAMAICA: Ridge east of Cuna Cuna Gap, St. Thomas Parish, alt. 750–840 meters, *Maxon* 9443 (NY, US)

The two Jamaican species occupy different ranges, *A. grisebachianus* being found in central Jamaica and *A. pubescens* in the easternmost part of the island.

2. Alloplectus ambiguus Urban, Symb. Antill. **1**: 408. 1899.

Alloplectus ambiguus var. *chlorosepalus* Urban, loc. cit.

Alloplectus ambiguus var. *erythrosepalus* Urban, loc. cit. Type from Puerto Rico, *Eggers* 1302.

Scandent shrub, sparingly branched, the branchlets 4–6 mm. thick, hirsutulous toward apex (the hairs many-celled, colorless), glabrescent and shining below; leaves of a pair strongly unequal, petiolate, the petiole 2–16 mm. long, hirsutulous; larger leaf blades, oblong or elliptic (average ratio of length to width 1.9: 1), variable in size, 4.2–11.5 cm. long (average length 6 cm.), 2–4.9 cm. wide (average width 3.1 cm.), acute or short-acuminate, cuneate or rounded at base, oblique, membranaceous, concolorous, not red-spotted, inconspicuously crenate (the teeth commonly 6–8 on each side), hirsutulous above, strigillose beneath, the hairs minute, usually 2-celled, the primary veins 5 or 6 pairs; flowers 2 or 3 in an axil; pedicels 5–8 mm. long, hirsute, the hairs reddish or colorless; calyx green or red, the lobes erect, 6–9 mm. long in flower, dissimilar, the 2 anterior ovate, 5–6 mm. wide, coarsely toothed on both sides, the teeth 3 on each side, the lateral sepals oblong, about 4 mm. wide, toothed only on the anterior margin, the posterior sepal narrowly oblong, 2.5–3 mm. wide, entire, all hirsutulous on both sides; corolla yellow, erect in calyx, 19–22 mm. long, scarcely gibbous at base, the tube about 3 mm. broad above base, slightly ventricose at middle and 5 mm. wide, puberulous externally and also sparsely hirsutulous above with longer hairs, contracted in throat, this 4 mm. wide, the limb about 5 mm. wide, nearly regular, the lobes subequal, about 2 mm. long, glandular-pilosulous within; filaments glabrous; anthers broader than long, about 0.8 mm. long, 1.1 mm. wide; ovary hairy at apex; style glandular-pilosulous; disk gland posterior, glabrous, bilobed.

Type from Puerto Rico, *Eggers* 1303 (not seen)

SPECIMENS EXAMINED:

PUERTO RICO: Luquillo Mountains, *Wilson* 28 (NY, US), 86 (NY); *Heller* 709 (NY), 4617 (F, G, NY, US). Sierra de Naguabo, *Sintenis* 1301 (F, G, Mo, NY, US), 1303 (G, US); *Shafer* 2225 (NY), 3594 (F, NY, US); *Stevenson* 5273 (US). Monte Cerrote, *Britton & Brown* (F, Mo, NY, US). Alto de la Bandera, *Britton & Shafer* 2016 (NY, US); *F. L. Stevens* 7297 (NY). Alto de la Piedra, *Britton & Earle* 6092 (NY, US). Indiera Baja, *Britton & Britton* 7211 (NY). Mount Mandios, *Britton & Cowell* 931 (NY, US). Arroyo de los Corchos, *Britton, Cowell, & Brown* 5235 (G, NY). Cayey, *Kuntze* 479 (NY). Sierra de Jumos,

Sintenis 2777 (F). El Yunque, *Otero* 581 (F); *Johnston* 751 (NY); *Hess* 2794 (NY); *Boynton* 8222 (NY). Between Guayama and Cayey, *Britton, Britton, & Brown* 6537 (NY). Without locality, *Garber* 89 (G).

The color of the sepals seems too variable to be used in distinguishing varieties, as Urban attempted.

3. Alloplectus cristatus (L.) Mart. Nov. Gen. & Sp. 3: 57. 1829.

Besleria cristata L. Sp. Pl. 619. 1753.

Crantzia cristata Scop. Intr. Hist. Nat. 173. 1777.

Lophia phoenicea Desv. in Hamilt. Prodr. Pl. Ind. Occ. 47. 1825 (nom. abort.)

Columnea cristata Kuntze, Rev. Gen. Pl. 2: 471. 1891.

Scandent, epiphytic shrub, sparingly branched, the branches 2–4 mm. in diameter, densely strigose or subtomentose at apex (the hairs colorless, flaccid, many-celled), glabrescent below; leaves of a pair subequal, petiolate, the petiole 8–15 mm. long, densely pilosulous; leaf blades ovate to elliptic (average ratio of length to width 2:1), 3.8–5.5 cm. long (average length 4.9 cm.), 1.6–3.6 cm. wide (average width 2.5 cm.), short-acuminate at apex, cuneate at base, membranaceous, concolorous, not reddish beneath, conspicuously serrate (the teeth 11–23 on each side), substrigose above (the hairs 2- or 3-celled), strigillose beneath, the hairs minute, 2-celled, the terminal cell white, the primary veins 6 or 7 pairs; flowers solitary, axillary, ebracteate; pedicels 2–3 cm. long, densely hirsute; calyx red, angulate, the lobes erect, broadly ovate, about 2 cm. long in flower, 2 cm. wide (including teeth), deeply cordate at base, connate at base for about 3 mm., the posterior lobes smaller and narrower, all conspicuously laciniate-serrate (the teeth 9 or 10 on each side, up to 3 mm. long), strigillose on both sides; corolla yellow, oblique in calyx, 3 cm. long, gibbous at posterior base (3.5 mm.), the tube about 5 mm. wide above base, about 2.6 cm. long, densely pilosulous externally, scarcely ventricose, about 6.5 mm. wide at middle, not or scarcely contracted in throat, the limb about 8.5 mm. wide, nearly regular, the lobes 2–4 mm. long, glabrous and eglandular within; filaments glabrous; anthers broader than long, about 1.7 mm. long, 2.2 mm. wide; ovary strigillose all over; style glabrous; stigma stomatomorphic; disk gland posterior, glabrous, entire.

Type from Martinique, *Plumier*.

SPECIMENS EXAMINED:

MARTINIQUE: *Sieber* s. n. (Mo). Beyond L'Alma, *L. H. & E. Z. Bailey* 227 (US). Bois de Lorrain, *Duss* 1877 p.p. (NY). Poste Forestier de Donis-Balata, *Stehlé* 2133 (NY).

3a. Alloplectus cristatus var. **crenatus** Morton, var. nov.

A var. *typica* calycis lobis leviter crenatis non laciniato-serratis differt.

Differs from the typical variety in the calyx lobes being lightly crenate and not laciniate-serrate.

Type in the New York Botanical Garden, collected in St. Vincent, by H. H. & G. W. Smith (No. 147).

ADDITIONAL SPECIMENS EXAMINED:

GRENADA: *Sherring* 267 (F). Azimas Mountain, March 22, 1905, *Broadway* (NY, US). Mount St. Catherine, alt. 720 meters, *Eggers* 6160 (US). Grand-Etang, October 18, 1905, *Broadway* (F, G).

3b. Alloplectus cristatus var. **brevicalyx** Morton, var. nov.

A var. *typica* calycis lobis brevioribus, angustioribus, basi parum cordatis, dentibus paucioribus multo brevioribus differt.

Differs from the typical variety in its shorter and narrower calyx lobes, these about 15 mm. long and 10 mm. wide, scarcely cordate at base, the teeth fewer (4–7 on each side) and much shorter.

Type in the New York Botanical Garden, collected at Laudat, Dominica, in 1903, by F. E. Lloyd (No. 191).

ADDITIONAL SPECIMENS EXAMINED:

DOMINICA: *Cooper* 43 (NY). Boiling Lake, *Eggers* 602 (G). Along Imperial Road, *Hodge* 825 (NY, US). Corona, *Bailey* 768 (NY).

GUADELOUPE: *Duss* 2985 (F, NY, US). Bains-Jaunes, *L. H. & E. Z. Bailey* 156 (US); *Stehlé* 424 (US), 1148 (NY).

ST. KITTS: *Eggers* s. n. (US). Molyneaux Estate, *Britton & Cowell* 300 (NY, US).

4. Alloplectus grisebachianus (Kuntze) Urban, Symb. Antill. **2**: 357. 1901.

Pterygoloma cristatum Griseb. Fl. Brit. W. Ind. 464. 1861.

Columnea grisebachiana Kuntze, Rev. Gen., Pl. **2**: 472. 1891.

Alloplectus cristatus sensu Fawc. Prov. List. Fl. Jam. 28. 1893, non Mart.

Columnea hunnewellii L. B. Smith, Rhodora **39**: 275. 1937. Type from Mount Diablo, St. Ann Parish, Jamaica, *Hunnewell & Griscom* 14481 (G).

Scandent shrub, ramose, the branchlets about 2 mm. thick, rather densely and coarsely pilosulous, the hairs reddish, several-celled; leaves of a pair subequal, petiolate, the petiole 5–15 mm. long, the blades oval or ovate (average ratio of length to width 1.8 : 1), 2.6–5.5 cm. long (average length 4 cm.), 1.7–3 cm. wide (average width 2.2 cm.), abruptly short-acuminate, obtuse or rounded at base, remotely and inconspicuously denticulate, concolorous, membranous, appressed-hirsute on both sides, the hairs hyaline, 4 or 5 cells long, the primary veins 4 or 5 pairs; flowers solitary, axillary, ebracteate; pedicels about 1 cm. long, pilosulous with red hairs; calyx green, the lobes erect, free, lanceolate, 9–12 mm. long (the posterior lobe shorter, about 8 mm. long), 4–5 mm. broad including teeth, acuminate, laciniate with 4 or 5 prominent teeth on either side (the apical ones reduced to glandular-denticulations), sparsely hirsute outside with long, many-celled, reddish hairs and bearing also closely appressed 2-celled whitish hairs, glabrous within, long-ciliate with many-celled, reddish hairs; corolla red with narrow yellow stripes, 2.5–2.9 cm. long, erect in calyx, slightly gibbous at posterior base, the tube about 3 mm. wide above base, 2.3–2.5 cm. long, subventricose at middle (6–7 mm. wide), slightly contracted toward throat, sparsely pilosulous externally, with small, appressed hairs and scattered long, spreading ones, the limb about 7 mm. wide, nearly regular, the lobes subequal, about 1.5 mm. long, glandular-pilosulous within; filaments glabrous; anthers quadrate, 1–1.5 mm. long and broad; ovary glabrous; style glandular-pilosulous; disk gland posterior, glabrous, entire; berry white (teste Harris), red (teste Hunnewell).

Type from Jamaica, *Purdie*.

SPECIMENS EXAMINED:

JAMAICA: Hollymount, St. Catherine Parish, *Harris* 8891 (NY); *Britton* 718 (F, NY). Union Hill, near Moneague, St. Ann Parish, *Britton & Hollick* 2744 (NY). Mount Diablo, St. Ann Parish, *Hunnewell* 15357 (G, NY), s. n. (US). Peckham Woods, Clarendon Parish, alt. 750 meters, *Harris* 12766 (F, Mo, NY, US).

4a. Alloplectus grisebachianus var. **ochrotrichus** Urban, Symb. Antill. **5**: 497. 1908.

Differs from the typical variety in having colorless instead of reddish hairs on the branchlets.

Type from Troy, Trelawny Parish, Jamaica, alt. 600 meters, *Harris* 8549 (isotype NY).

ADDITIONAL SPECIMENS EXAMINED:

JAMAICA: Troy, *Harris* 8820 (NY). Olive River, Manchester Parish, alt. 1,000 meters, *Harris* 8413 (F, NY).

5. Alloplectus domingensis Urban, Symb. Antill. **2**: 357. 1901.

Scandent shrub, sparingly branched, the branchlets slender, 2.5–3 mm. thick, hirsute, the hairs many-celled, purplish; leaves of a pair subequal or strongly unequal, elliptic (average ratio of length to width 2.1:1), 1.6–5 cm. long (average length 3.2 cm.), 1–2.2 cm. wide (average width 1.5 cm.), obtuse or acutish, cuneate at base, membranaceous, rather prominently dentate or serrate, the teeth 4–8 on each side, green above, often red beneath (at least the veins), hirsute on both sides with reddish many-celled hairs, the primary veins 4 or 5 pairs; flowers solitary, axillary, ebracteate; pedicels 10–15 mm. long, densely red-hirsute; calyx red, the lobes erect, subequal, free, broadly ovate in outline, 10–14 mm. long in flower, 9–12 mm. wide including teeth, deeply and coarsely laciniate-toothed (the central part about 3 mm. wide, the teeth up to about 5 mm. long and 1.5 mm. wide 2 or 3 on each side), acuminate, red-hirsute outside, sparingly so within, long-ciliate; corolla yellow, not striped with red, erect in calyx, 2.4–2.6 cm. long, gibbous at posterior base, the tube about 3 mm. wide above base, 2.1–2.3 cm. long, slightly ventricose at middle (about 7 mm. wide), contracted toward throat (6 mm. wide), externally puberulous and bearing also scattered, long, many-celled hairs, the limb slightly oblique, about 8 mm. broad, the lobes about 3 mm. long, the posterior connate higher, glandular-pilosulous within; filaments glabrous; anthers broader than long, about 1.5 mm. long, 2 mm. wide; ovary sparsely hairy at apex; style glandular-pilosulous; disk gland posterior, glabrous, entire.

Type from Jiménes River, Dominican Republic, alt. 1,200 meters, *Eggers* 2314 (not seen).

SPECIMENS EXAMINED:

HAITI: Vicinity of Furcy, alt. 1,300 meters, *Leonard* 4630 (NY, US). Vicinity of Marmelade, Dept. du Nord, alt. 800 meters, *Leonard* 8359 (US). Vicinity of Bassin Bleu, alt. 630–1,500 meters, *Leonard & Leonard* 15058 (NY, US). Vicinity of Mission, Fonds Varettes, alt. 1,000 meters, *Leonard* 3802 (F, NY, US). Massif de la Selle, alt. 1,725 meters, *Ekman* H1129 (US). La Brande to Mount Balance, alt. 1,060 meters, *Nash & Taylor* 1724 (NY, US). Gonave Island, *Eyerdam* 280 (G, NY, US).

DOMINICAN REPUBLIC: Vicinity of Constanza, *von Tuerckheim* 3375 (NY); *Abbott* s. n. (US). Pac Mingo near Paradis, Prov. Barahona, alt. 500 meters, *Fuertes* 329 (F, G, Mo, NY, US). Vicinity of Paradis, Prov. Barahona, *Abbott* 1610 (US), 1583 (G, NY, US). Maniel, Prov. Barahona, alt. 600 meters, *von Tuerckheim* 2781 (NY).

5a. Alloplectus domingensis var. **microphyllus** Morton, var. nov.

A var. *typica* foliis parvis 1–2 cm. longis, 4.5–5 mm. latis, utrinque sparse strigillosis differt.

Differs from the typical variety in its small leaves (1–2 cm. long, 4.5–5 mm. broad), sparsely strigillose on both sides.

Type in the U. S. National Herbarium, No. 1,303,436, collected on Montagnes de la Hotte, Haiti, August 25, 1927, by W. J. Eyerdam (No. 351). Isotypes at G, NY.

NEW SPECIES OF BESLERIA

In 1939 I published [4] a revision of *Besleria* (Gesneriaceae), recognizing 137 species and considering four others as dubious. Since that time one species from Honduras [5] and three species and two varieties

[4] Contr. U. S. Nat. Herb. **26**: 395–474. 1939.

[5] *Besleria macrocalyx* Morton, Field Mus. Publ. Bot. **9**: 335. 1940.

from Panama [6] have been described. Recent collections have disclosed two more new species from Panama, and 11 species and one variety from Colombia, which are here described. I have included also a few citations of additional specimens of rare species.

Besleria arborescens Morton, sp. nov.

Arbor parva, ramulis dense strigosis; folia lanceolata, supra glabra, subtus praecipue in venis strigosa, venis primariis 5–6-jugis; flores in axillis aggregati, pedicellis brevibus; calycis lobi liberi, ovati, rotundati, non mucronati, integri, externe dense subtomentosi, intus glabri; corolla erecta, tubulosa, externe dense pilosa, intus glabra, faucem versus glandulosa; ovarium dense tomentosum; discus annularis, glaber.

Small tree 5.4 meters high; ultimate branchlets deeply sulcate, 4 mm. in diameter, densely strigose, yellowish-subtomentose at apex; leaves opposite, equal; petiole 1.2–2.7 cm. long, channeled above, densely strigose; leaf blades lanceolate, 12–27 cm. long, 2.7–5.7 cm. broad, sharply long-acuminate, cuneate and subdecurrent at base, membranaceous, entire, deep green and glabrous above, very pale beneath, strigose, especially on the midrib and veins, the primary veins 5 or 6 pairs; common peduncle obsolete, the pedicels aggregate in the leaf axils, few, very short (8 mm. long or less), densely strigose; calyx lobes free to base, very broadly ovate, about 6 mm. long and 3.5 mm. wide, venose, rounded at apex, not mucronate, subcoriaceous, densely subtomentose without, glabrous within, long-ciliate; corolla pink (teste Wedel), slightly oblique in the calyx, about 16 mm. long, not spurred, the tube cylindric, about 4 mm. wide, not ventricose, densely pilose externally, lacking a hairy ring within at insertion of stamens, glandular within the throat, the limb about 8 mm. wide, slightly bilabiate, the lobes orbicular; filaments short-connate at very base, flat, glabrous; staminodium conspicuous; ovary ovoid, densely white-tomentose; style pubescent; disk annular, somewhat thicker posteriorly, glabrous; fruit green, globose, densely short-pubescent.

Type in the U. S. National Herbarium, No. 1,823,808, collected in the vicinity of Chiriquí Lagoon, Province of Bocas del Toro, Panama, by H. von Wedel (No. 2353).

Besleria arborescens is referable to sect. *Eubesleria*, subsect. *Sessiles*, of my revision. It will key out in the neighborhood of *B. pennellii* Morton, a small subshrub of the high mountains of Colombia, to which it is probably not closely allied. The only species known from Central America with which it could be confused is the common *S. solanoides* H. B. K., which differs especially in its glabrous rather than densely pilose corolla.

Besleria attenuata Morton, sp. nov.

Frutex ramosus, ramulis hirsutis; petioli hirsuti; lamina foliorum anguste lineari-lanceolata, longe attenuata, basi cuneata, membranacea, remote denticulata, utrinque plus minusve hirsuta, venis primariis 8–9-jugis; pedunculus communis 2–4 cm. longus, apice bibracteatus, bracteis saepe foliosis, pedicellis 4–5, brevibus, hirsutis; calycis lobi alte connati, inaequales, acuminati, externe longe pilosi, intus glabri; corolla erecta, ecalcarata, tubo cylindrico, faucem versus ampliato, externe glanduloso-piloso, intus glabro, limbo terminali, parvo, regulari, lobis utrinque glanduloso-pubescentibus; filamenta in medio corollae tubi inserta, glabra; ovarium glabrum; stylus glaber; discus annularis, glaber.

Shrub 1 meter high, the branches numerous, about 3 mm. in diameter, the branchlets slender, 2 mm. in diameter, hirsute; petioles 7–19 mm. long, hirsute;

[6] *Besleria allenii*, *B. allenii* var. *paucivenia*, *B. barbensis* var. *hirsuta*, *B. crassicaulis*, and *B. obliqua*, Ann. Missouri Bot. Gard. **29**: 38–41. 1942.

leaf blades narrowly linear-lanceolate, the larger 25 cm. long and 4.5 cm. broad, long-attenuate, narrowly cuneate at base, membranaceous, remotely denticulate, very sparsely pilose above, hirsute beneath, especially along the midrib, the primary veins 8 or 9 pairs, the secondary inconspicuous; common peduncle 2–5 cm. long, sparingly hirsute, bibracteate at apex, the bracts sometimes leaflike and 15 mm. long; pedicels 4 or 5 on each peduncle, 8–10 mm. long, hirsute; calyx 10 mm. long, the lobes connate for ½ to ⅔ their length, unequal, 3 about 3.5 mm. long, the other 2 about 5.5 mm. long, all ovate, sharply acuminate, membranaceous, long-pilose externally, glabrous within; corolla yellow, 15–18 mm. long, erect in calyx, not spurred at base, the tube cylindric, about 2.5 mm. broad, not ventricose, gradually enlarged to throat, conspicuously short-pilose externally, the hairs gland-tipped, glabrous within, the throat about 5 mm. wide, the limb terminal, about 6.5 mm. wide, the lobes subequal, glandular-pubescent on both sides; filaments inserted in middle of corolla tube; ovary and style glabrous; disk annular, glabrous.

Type in the U. S. National Herbarium, No. 1,707,763, collected on trail from Gesén to San Juan, Department of Antioquia, Colombia, at 300 meters elevation, February 22, 1937, by Oscar Haught (No. 2164).

The present species belongs in *Eubesleria*, subsection *Elongatae*, and will key out to *B. peruviana* Fritsch, from which it may be distinguished as follows:

Leaf blades elliptic or lance-elliptic, nearly entire; pedicels 1.5–2 cm. long; calyx 15 mm. long; corolla tube glabrous externally ..... **B. peruviana**

Leaf blades narrowly linear-lanceolate, not over 4.5 cm. broad, obviously denticulate; pedicels 8–10 mm. long; corolla tube densely glandular-pilose externally ..... **B. attenuata**

There is also some relationship to *B. grandifolia* Schott of southern Brazil, which may be distinguished as follows:

Leaf blades elliptic, entire; calyx lobes glandular-pilosulous externally, coriaceous; ovary puberulous ..... **B. grandifolia**

Leaf blades narrowly linear-lanceolate, denticulate; calyx lobes hirsute, eglandular, membranaceous; ovary glabrous ..... **B. attenuata**

Besleria calantha Morton, sp. nov.

Caules glabri; petioli crassi, glabri; lamina foliorum late elliptica, acuta, basi cuneata, integra, chartacea, mox utrinque glabra, margine perspicue longe ciliata, venis primariis ca. 6-jugis, secundariis prominulis; pedunculi communes brevissimi, pedicellis paucis, sparse pilosulis; calycis lobi liberi, erecti, aequales, ovati, integri, externe parce pilosi, intus glabri, longe ciliati; corolla erecta, ecalcarata, tubo cylindrico, non ventricoso, ad faucem ampliato, externe parce pilosulo, intus basi glabro, superne glanduloso, limbo terminali, bilabiato, magno, lobis patentibus, inaequalibus, glabris, parce ciliolatis; androecium glabrum; ovarium glabrum; stylus pilosus; discus annularis, uno latere brevior, glaber.

Shrub 1–2 meters high; branchlets angled, about 4 mm. in diameter, glabrous except at apex; petioles thick, about 2 cm. long, glabrous; leaf blades broadly elliptic, 11–11.5 cm. long, 5–6 cm. broad, acute, cuneate at base, chartaceous, entire, green and glabrous above, paler and entirely glabrous beneath except the youngest leaves (these sparsely strigillose), conspicuously long-ciliate, in young leaves the cilia forming a dense yellowish border 1 mm. thick all around the leaf, some of the cilia persistent even at maturity, the primary veins about 6 pairs, not impressed above, the secondary veins rather prominent, especially above; common peduncle very short or obsolete, the pedicels slender, 10–12 mm. long, very sparsely pilosulous; calyx lobes free, imbricate, erect, subequal, ovate, 7–10 mm. long, 3.5–5 mm. broad, acute, entire, sparsely pilose externally, glabrous within,

conspicuously long-ciliate; corolla orange, 15–19 mm. long, erect in calyx, not spurred at base, the tube cylindric, about 4.5 mm. thick, gradually enlarged to throat (this about 6 mm. wide), sparsely pilosulous externally, glabrous within at base, sparsely glandular toward throat, the limb terminal, 15 mm. broad, bilabiate, the lobes spreading, unequal, glabrous externally, ciliolate; androecium glabrous; anther cells confluent; ovary glabrous; style sparsely pilose; disk annular, but much lower on one side.

Type in the U. S. National Herbarium, No. 1,796,356, collected at Abra de San Andrés, below Gabinete, Cordillera Oriental, Department of Huila, Colombia, at 1,900–2,100 meters elevation, March 24, 1940, by J. Cuatrecasas (No. 8637).

Besleria calantha belongs in the section *Rhynchobesleria*, subsection *Labiatae*, but it is not similar to any of the three species of that group. *B. labiosa* Hanst. of Venezuela and *B. longipes* Urban of Trinidad differ in their thin, strongly toothed leaf blades. *B. crassa* Morton, of Colombia, may be distinguished as follows:

Leaf blades entirely glabrous, not ciliate; calyx lobes glabrous, not ciliate; corolla glabrous ..... **B. crassa**

Leaf blades conspicuously long-ciliate when young, the cilia forming a dense band 1 mm. thick, some of the cilia persisting at maturity; calyx lobes sparsely pilose externally, long-ciliate; corolla sparsely pilosulous externally, glandular within ..... **B. calantha**

Besleria corallina Fritsch.

This species has been known only from the Department of Loreto, Peru. It may now be recorded from Colombia: Between Mocoa and Sachamates, Comisaría del Putumayo, alt. 1,400–1,500 meters, *Cuatrecasas* 11409.

Besleria corallinoides Fritsch.

It is somewhat doubtful if the distinctions between *B. corallina* and *B. corallinoides* given in my revision invariably hold true. The two may always be distinguished, however, by the corollas, which are densely pilose in *B. corallina* and merely puberulous in *B. corallinoides*. The latter species, known previously only from Ecuador, has recently been collected in Colombia: Quebrada de la Hormiga, Comisaría del Putumayo, alt. 290 meters, *Cuatrecasas* 11088.

Besleria ecuadorensis (Fritsch) Morton.

This rare species has been known only from the type from Niebly, Ecuador. A recent collection from Colombia is: Between Sachamates and San Francisco de Sibundoy, Comisaría del Putumayo, alt. 1,600–1,750 meters, *Cuatrecasas* 11474.

Besleria eriocalyx Morton, sp. nov.

Frutex, ramis crassis, dense hirsutis; lamina foliorum late elliptica, acuminata, basi cuneata, integra, supra pilosa, subtus hirsuta, venis primariis 10–11-jugis; pedicelli in axillis foliorum aggregati, numerosi, breves; calycis lobi inaequales, ovati vel ovato-oblongi, magni, rotundati, integri, externe dense pilosi, intus glabri; corolla obliqua, ecalcarata, tubo valde inflato, externe dense piloso, intus annulum pilosum basi gerente, limbo terminali, minuto, lobis non ciliatis; antherae pilosae; ovarium glabrum; stylus pilosulus; discus semiannularis, glaber.

Shrub; stems thick, 9 mm. in diameter, quadrangular, conspicuously long-hirsute; petioles about 2.2 cm. long, long-hirsute; leaf blades broadly elliptic, 17–21 cm. long, 8–9.6 cm. broad, acuminate, cuneate at base, entire, chartaceous, green above, persistently pilose, pale beneath, conspicuously hirsute on veins and mesophyll beneath, the primary veins 10 or 11 pairs, the secondary veins obscure; common peduncle obsolete, the pedicels numerous, aggregate in the leaf axils, short (1 cm. or less), hirsute; calyx lobes free, unequal, erect, the anterior and

lateral pairs ovate, 9 mm. long, 5 mm. broad, the posterior one ovate-oblong, 11 mm. long and 8 mm. broad near base, all rounded, not mucronate, entire, venose, lacking a midrib, densely pilose externally, long-ciliate, glabrous within; corolla orange, oblique in calyx, not spurred, about 13 mm. long, the tube conspicuously inflated, becoming 7 mm. broad, densely pilose externally, densely white-pilose within in a ring at insertion of filaments, glabrous and eglandular within throat, conspicuously contracted in throat, the limb minute, terminal, about 5 mm. broad, the lobes rotund, glabrous, not ciliate; filaments glabrous; anthers coherent, long-pilose, the cells confluent; ovary glabrous; style pilosulous; disk semiannular, interrupted anteriorly, glabrous.

Type in the U. S. National Herbarium, No. 1,796,354, collected in woods at Abra de San Andrés, below Gabinete, Cordillera Oriental, Department of Huila, Colombia, at 1,900–2,100 meters elevation, March 24, 1940, by J. Cuatrecasas (No. 8611). A second collection in the Herbario Nacional Colombiano is from Guadalupe, Cordillera Oriental, Huila, alt. 1,900 meters, *E. Pérez Arbeláez & Cuatrecasas* 8354.

The three species *B. lasiantha*, *B. oxyphylla*, and *B. eriocalyx* here described form a natural group that does not fit well in any of the subsections of *Eubesleria* that I proposed in my revision of the genus. Although the calyx lobes are too long, in relation to the corolla, to agree with the delimitation of subsection *Sessiles*, I am referring them tentatively to that group. In my key to that subsection they will run at once to *B. densiflora* Fritsch of Peru, and they may indeed be really related to that species, still known from the original collection only. As a group they are characterized by the large, unequal, rounded calyx lobes, the relatively small, densely pilose corollas with strongly inflated tube (with a pilose ring within at base) and minute, regular limb, and especially by the pilose anthers.

These four species may be distinguished as follows:

Calyx lobes 4 mm. long; corolla lobes ciliate---------- **B. densiflora**
Calyx lobes 9–11 mm. long; corolla lobes not ciliate.
  Stems densely hirsute; leaf blades pilose above, hirsute beneath. Calyx lobes densely pilose externally, entire---------- **B. eriocalyx**
  Stems glabrous; leaf blades glabrous above, minutely strigillose on veins beneath.
  Calyx lobes regularly serrulate, pilose externally, not ciliate-- **B. oxyphylla**
  Calyx lobes entire or merely irregularly erose, glabrous except the strongly ciliate margins---------- **B. lasiantha**

Besleria florida Morton, sp. nov.

Frutex; caules hirsuti; petioli breves, hirsuti; lamina foliorum lanceolato-oblonga, acuminata, basi cuneata, membranacea, remote denticulata, utrinque praecipue in venis hirsuta, venis primariis 8–9-jugis; pedicelli axillares, pauci, hirsuti; calycis lobi liberi, suborbiculares, parvi, rotundati, subcoriacei, externe pilosi, intus glabri, ciliati; corolla erecta, ecalcarata, tubo ventricoso, faucem versus contracto, externe glabro, intus glanduloso, limbo terminali, parvo, lobis glabris, subaequalibus; filamenta glabra; ovarium glabrum; stylus glaber; discus annularis, glaber.

Terrestrial shrub, 1–1.5 meters high; stems little branched, 2–3 mm. in diameter, hirsute, the hairs deciduous, leaving the branchlets scabrous by the inflated bases; petioles about 2 cm. long, hirsute; leaf blades lance-oblong, up to 13 cm. long, 4 cm. broad, acuminate, cuneate at base, membranaceous, nearly entire (remotely glandular-denticulate), sparsely hirsute on both sides, especially on the veins beneath, the primary veins 8 or 9 pairs, the secondary inconspicuous; common peduncle obsolete, the pedicels aggregate in the leaf axils, few, 1.5–2 cm. long, hirsute; calyx lobes nearly free, erect, suborbicular, 3.5 mm.

long, 3 mm. wide, subcoriaceous, rounded, entire, venose, a little mucronate, sparsely pilose externally, eglandular, ciliate, glabrous within; corolla maroon (teste Killip), 13–17 mm. long, erect in calyx, not spurred at base, the tube about 5.5 mm. broad at base, ventricose upwardly, becoming 7 mm. broad, contracted toward throat, glabrous externally, lacking a hairy ring within at insertion of stamens, glandular within, especially toward throat, this about 4 mm. broad, the limb terminal, narrow, the lobes subequal, glabrous; androecium glabrous; ovary and style glabrous; disk low, annular, glabrous.

Type in the U. S. National Herbarium, No. 1,770,609, collected at Monte Frío, Yanaconas, Department of El Valle, Colombia, at 1,700–1,850 meters elevation, February 27–March 1, 1939, by E. P. Killip and H. García (No. 33713). A second specimen with smaller leaves and shorter petioles was collected at El Silencio, Yanaconas, El Valle, by Killip & García (No. 33753).

The relationship of this species is with the North American *B. hirsuta* (Oerst.) Hanst., which may be distinguished as follows:

Petioles elongate (up to 6.5 cm. long); leaf blades large (up to 9.5 cm. broad), the primary veins 11–13 pairs; calyx lobes 5 mm. long_____ **B. hirsuta**

Petioles shorter (not over 2 cm. long); leaf blades smaller (not over 4 cm. broad, usually less), the primary veins 8 or 9 pairs; calyx lobes 3.5 mm. long. **B. florida**

Besleria ignea var. **semiannularis** Morton.

COLOMBIA: Puerto Ospina, on Río Putumayo, Comisaría del Putumayo, alt. 230 meters, November 14, 1940, *Cuatrecasas* 10582.

Previously known only from the type from Florencio, Caquetá, Colombia.

Besleria inaequalis Morton, sp. nov.

Suffrutex, caulibus non ramosis, teretibus, dense strigosis; petioli breves; lamina foliorum anguste elliptica, parva, acuminata, basi cuneata, integra, supra glabra, subtus pallida, in venis strigosa, venis primariis ca. 5-jugis; pedicelli axillares, pauci, pilosuli; calycis lobi inaequales, antici lanceolati, acuminati, posticus ovatus, acutus, omnes integri, externe pilosi, intus glabri, venosi; corolla erecta, ecalcarata, tubo vix ventricoso, externe piloso, intus annulum pilosum basi gerente, in fauce contracto, intus glanduloso, limbo regulari, terminali, parvo, lobis eciliatis; filamenta basi pilosa; antherae glabrae; ovarium apice pilosum; stylus pilosulus; discus annularis, glaber.

Shrub 2 meters high; stems unbranched, at least upwardly, terete, about 5 mm. in diameter, densely and closely strigose; petioles very short, 4–8 mm. long, densely strigose; leaf blades narrowly elliptic, small, up to 10 cm. long and 3.5 cm. broad, short-acuminate, broadly cuneate at base, entire, chartaceous, dark green and glabrous above, pale beneath, conspicuously strigose on the veins beneath, the primary veins about 5 pairs, the secondary inconspicuous; common peduncle obsolete, the pedicels axillary, few (mostly only 1 or 2), 12–15 mm. long, pilosulous; calyx lobes free, erect, unequal, the anterior pair narrow-lanceolate, 1 cm. long, 2 mm. broad, long-acuminate, the lateral pair ovate-lanceolate, 9.5 mm. long, 3.5 mm. broad, acuminate, the posterior lobe ovate, 8 mm. long, 4.5 mm. broad, acute, all venose, lacking a conspicuous midrib, not mucronate, entire, densely pilose externally, glabrous within; corolla orange, erect in calyx, not spurred at base, 19–23 mm. long, the tube cylindric, scarcely ventricose, 6–7 mm. thick, slightly contracted in throat, conspicuously pilose externally, pilose within in a ring at insertion of the filaments, glandular within near throat, the throat about 5 mm. broad, the limb terminal, about 6 mm. broad, the lobes subequal, rounded, glabrous, not ciliolate; filaments pilose at very base, glabrous elsewhere; anthers free, glabrous; ovary pilosulous at apex; style pilosulous; disk annular, glabrous.

Type in the U. S. National Herbarium, No. 1,798,384, collected between Puerto Asís and Umbría, Comisaría del Putumayo, Colombia, at 270–350 meters elevation, December 23, 1940, by J. Cuatrecasas (No. 11258).

Among the species of *Eubesleria*, section *Sessiles*, the present one is perhaps most closely related to *B. nemorosa* Morton, of the Western Cordillera of El Cauca and El Valle. The two may be distinguished as follows:

Calyx lobes subequal, ovate, 6–6.5 mm. long, merely acute; common peduncle elongate (rarely obsolete); stems soon glabrate---------- **B. nemorosa**

Calyx lobes unequal, the anterior lanceolate, the lateral ovate-lanceolate, the posterior ovate, 8–10 mm. long, acuminate (except the posterior lobe); common peduncle obsolete; stem persistently and densely strigose. **B. inaequalis**

Besleria lasiantha Morton, sp. nov.

Frutex; caules glabri; lamina foliorum anguste elliptica, acuminata, basi cuneata, supra glabra, subtus fere glabra, venis primariis 6–7-jugis, secundariis obscuris; pedicelli in axillis aggregati, glabri; calycis lobi liberi, erecti, inaequales, late elliptici, rotundati, venosi, utrinque glabri, ciliati, erosi; corolla obliqua, ecalcarata, perspicue inflata, externe pilosa, intus basi annulum pilosum gerens, limbo terminali, minuto, glabro; antherae longe pilosae, connatae; ovarium glabrum; stylus vix pilosulus; discus semiannularis, glaber.

Shrub; stems slender, sparingly branched, glabrous except at tip, quadrangular, 3.5 mm. in diameter; leaves opposite, equal; petiole 10–13 mm. long, glabrous; leaf blades narrowly elliptic, 12–15 cm. long, 4.2-5.5 cm. broad, long-acuminate, cuneate at base, entire, chartaceous, green and glabrous above, not rugose, paler beneath, nearly glabrous except for a few minute, appressed hairs along the veins, the primary veins 6 or 7 pairs, the secondary obscure; common peduncle obsolete, the pedicels aggregate in the leaf axils, numerous, glabrous, about 1.2 cm. long, thickened apically; calyx lobes nearly free, conspicuously imbricate, unequal, erect, the anterior and lateral pairs broadly elliptic, 8–9 mm. long, 4–5 mm. broad, rounded, not mucronate, the posterior one 11 mm. long and 7 mm. broad, carinate, all reticulate-venose, lacking a midrib, glabrous on both sides, long-ciliate and erose-marginate; corolla orange, about 16 mm. long, oblique, not spurred at base, the tube prominently inflated anteriorly, 12 mm. broad, conspicuously pilose (the hairs colorless, jointed), conspicuously pilose within in a ring at base, strongly contracted in throat (this about 3.5 mm. broad), glabrous within throat, eglandular, the limb terminal, minute, about 5 mm. broad, the lobes rotund, about 2 mm. long and wide, glabrous; filaments glabrous, flattened; anthers quadrate, connate, the cells confluent, conspicuously pilose; ovary glabrous; style sparingly pilosulous; disk tall, semiannular, interrupted anteriorly, glabrous.

Type in the U. S. National Herbarium, No. 1,796,365, collected at Sucre, Cordillera Oriental, Territorio de Caquetá, Colombia, at 1,000–1,300 meters elevation, April 4, 1940, by J. Cuatrecasas (No. 9056).

An additional specimen was collected at Cajón de Pulido, Quebrada del Río Hacha, Cordillera Oriental, Territorio de Caquetá, Colombiá, alt. 1,700 meters, by J. Cuatrecasas (No. 8753).

For relationships see under *B. eriocalyx* above.

Besleria modica Morton.

ECUADOR: Vicinity of Río Margarjitas, Prov. Tungurahua, alt. 1,225 meters, *Penland & Summers* 134.

Previously known only from the type from the Province of Oro, Ecuador.

Besleria nitens Fritsch.

COLOMBIA: Road from Fresno to Falán, Cañon of Río Gualí, Tolima, alt. 1,120–1,700 meters, *H. García* 8338.

Previously known only from the type collected at Tequendama, Dept. Cundinamarca, Colombia.

Besleria obtusa Morton, sp. nov.

Caules non ramosi, superne tomentosi; folia apicem versus conferta, breviter petiolata; lamina foliorum oblanceolata, magna, obtusa vel rotundata, basi angustata, integra, chartacea, supra glabra, ciliata, subtus in costa tomentoso-hirsuta, venis primariis strigillosis, 7–9-jugis; pedicelli axillares, conferti, breves; calycis lobi lineari-lanceolati, liberi, magni, inaequales, longe acuminati, integri, externe dense tomentoso-hirsuti, intus glabri; corolla erecta, ecalcarata, tubo cylindrico, non ventricoso, externe parce pilosulo, intus glabro, faucem versus ampliato, limbo terminali, regulari; ovarium pilosulum; discus semiannularis.

Low, unbranched subshrub less than 1 meter high; stems terete, tomentose at apex; leaves few, clustered at apex of stem, short-petiolate, the petiole not over 1 cm. long, tomentose; leaf blades oblanceolate, 18–23 cm. long, 5.7–9.5 cm. broad, obtuse or rounded at apex, narrowed at base, entire, chartaceous, green and glabrous above, paler beneath, tomentose-hirsute along the midrib, sparsely strigose along the veins, ciliate-tomentose on the margins, the primary veins 7–9 pairs, the secondary obscure; common peduncle obsolete, the pedicels aggregate in the leaf axils, numerous, less than 5 mm. long; calyx lobes free, erect, linear-lanceolate, unequal, 8–15 mm. long, 1–2.5 mm. broad, long-acuminate, entire, densely tomentose-hirsute externally, glabrous within; corolla yellow, 18–25 mm. long, erect in calyx, a little saccate at posterior base but not spurred, the tube cylindric, about 3 mm. broad, very sparsely pilosulous externally, glabrous within, not ventricose, enlarged to throat, this 5–6 mm. broad, the limb terminal, the lobes orbicular, spreading, subequal, not ciliate, sparsely pilosulous externally, sparsely glandular within; androecium glabrous; ovary pilosulous; stigma large, bilobed; disk more or less reduced to a low, posterior curved gland, some remnants of the remainder of the annulus persistent.

Type in the U. S. National Herbarium, No. 1,799,989, collected at Villavicencio, toward El Parrao, Intendencia of El Meta, Colombia, at 500 meters elevation, November 10, 1938, by J. Cuatrecasas (No. 4636).

A second specimen was collected at Villavicencio, January 19, 1939, by Oscar Haught (No. 2540).

It is difficult to decide as to the relationship of the present species, but apparently it should be referred to subsection *Confertae.* The pubescence is intermediate, definitely of neither a strigose nor a hirsute type, the midrib beneath being tomentose-hirsute, but the veins strigose. Almost all the species of the hirsute group have the leaves persistently pilose above, rather than glabrous as in the present species. In this group it will key to *B. compta* Morton of Peru, which may be distinguished as follows:

Calyx lobes toothed, ovate-lanceolate, acuminate; corolla densely hirsute without; disk annular, entire; leaf blades hirsute above ..... **B. compta**

Calyx lobes entire, linear-lanceolate, obtuse or rounded; corolla sparingly pilosulous without; disk reduced to a posterior gland; leaf blades glabrous above ..... **B. obtusa**

From all species of the strigose group, except *B. melancholica, B. obtusa* may be distinguished by its long, linear-lanceolate calyx lobes. *B. melancholica* (Vell.) Morton, of Rio de Janeiro, is utterly different in all its characters.

In the subsection *Sessiles* the present species would key to *B. trichostegia* Donn. Smith of Costa Rica, which differs in many respects, notably in its small calyx lobes (5 to 6 mm. long) and its thin, acuminate leaves, pilose on the upper surface.

Besleria ovalifolia Rusby.

BOLIVIA: San Bartolomé, basin of Río Bopi, La Paz, alt. 750–900 meters, *Krukoff* 10421.

Previously known only from the type collected at Songo, Bolivia.

Besleria oxyphylla Morton, sp. nov.

Caules glabri; lamina foliorum lanceolata, longe acuminata, basi cuneata, integra, supra glabra, subtus in venis minute strigillosa, venis primariis 8-jugis, secundariis obscuris; pedicelli in axillis foliorum aggregati, breves, sparse pilosi; calycis lobi ovati, serrulati, inaequales, externe pilosi, intus glabri, non ciliati; corolla erecta, ecalcarata, tubo valde inflato, externe piloso, intus basi annulum pilosum gerente, faucem versus valde contracto, limbo parvo, terminali, regulari; antherae pilosae; ovarium glabrum; stylus pilosulus.

Stems unbranched, rather thick, quadrangular, glabrous; petioles about 2.5 cm. long, glabrous; leaf blades lanceolate, 15–18 cm. long, 5–5.5 cm. broad, gradually long-acuminate, cuneate at base, chartaceous, entire, green and glabrous above, paler and sparingly strigillose beneath, the primary veins 8 pairs, impressed above, elevated beneath, ascending at an acute angle, the secondary veins obscure; common peduncle obsolete, the pedicels numerous, aggregate in the leaf axils, short (10 mm. long or less), not conspicuously enlarged apically, sparsely jointed-pilose; calyx lobes free, slightly unequal, ovate, the anterior and lateral pairs plane, about 9 mm. long and 4–5 mm. broad, the posterior one concave, 11 mm. long and 5.5 mm. broad, all narrowed upwardly but obtuse at apex, reticulate-venose, lacking a midrib, conspicuously serrulate, strongly pilose externally, glabrous within, not ciliate; corolla orange, about 16 mm. long, oblique in calyx, not spurred at base, the tube strongly inflated, becoming 8–9 mm. broad, white-pilose externally, pilose within in a ring at insertion of stamens, glabrous and eglandular in throat, strongly contracted in throat, this about 4 mm. broad, the limb terminal, minute, about 5 mm. broad, the lobes orbicular, spreading, minute, glabrous; filaments glabrous; anthers connate, pilose, the cells confluent; ovary glabrous; style pilosulous.

Type in the U. S. National Herbarium, No. 1,796,348, collected at Gabinete, Cordillera Oriental, Department of Huila, Colombia, alt. 2,300–2,450 meters elevation, March 22, 1940, by J. Cuatrecasas (No. 8502).

For relationship see comments under *B. eriocalyx* above.

Besleria rupestris Morton.

COLOMBIA: El Silencio, Yanaconas, El Valle, alt. 1,900–2,200 meters, *Killip & Garcia* 33818, 33835.

Previously known in Colombia from La Costa, El Cauca. According to Mr. Killip's notes, the fruit is white.

Besleria solanoides var. **dentata** Morton, var. nov.

Lamina foliorum magna, perspicue dentata; pedunculus communis paullum evolutus, pedicellis paucis; corolla glabra; ovarium glabrum.

Leaf blades 12–15 cm. long, 5–6 cm. broad, conspicuously dentate; common peduncle slightly developed, 3–5 mm. long, the pedicels 1 or 2; corolla glabrous; ovary glabrous.

Type in the U. S. National Herbarium, No. 1,770,481, collected along Quebrada Jellita, Bahía Solano, Intendencia of El Chocó, Colombia, at 50–100 meters elevation, February 22, 1939, by E. P. Killip and H. García (No. 33558).

Besleria solanoides H. B. K. is the most variable and most widely distributed species of the genus. The present plant differs in its obviously dentate leaves, these being entire or subentire in the typical form. It may be specifically distinct, for it has a rather well developed peduncle, whereas I do not recall seeing more than a vestige of peduncle in any of the numerous specimens of *B. solanoides* that I have examined.

Besleria spissa Morton, sp. nov.

Frutex; caules dense tomentosi; petioli breves, hirsuto-tomentosi; lamina foliorum late lanceolata, parva, acuminata, basi obtusa vel rotundata, integra, utrinque hirsuta, venis primariis 7–8-jugis, secundariis obscuris; pedicelli axillares, numerosi, breves; calycis lobi lanceolati, parvi, acuminati, glanduloso-serrulati, externe hirsuti, intus glabri; corolla ecalcarata, parva, tubo gradatim ampliato, faucem versus non contracto, externe piloso, intus glabro et eglanduloso, limbo terminali, parvo, regulari, glabro; androecium glabrum; ovarium apice pilosum; stylus pilosulus; discus annularis, glaber.

Shrub sparingly branched, the branchlets about 4 mm. in diameter, densely tomentose; petiole short, about 1 cm. long, densely hirsute-tomentose; leaf blades broadly lanceolate, small, 6–8 cm. long, 2.3–3.2 cm. broad, acuminate, obtuse or rounded at base, chartaceous, entire, persistently hirsute on both sides, the primary veins 7 or 8 pairs, the secondary inconspicuous; common peduncle obsolete, the pedicels crowded in the leaf axils, numerous, 5–7 mm. long in fruit, densely hirsute; calyx lobes free, erect, subequal, lanceolate, 6 mm. long, 2 mm. broad, long-acuminate, regularly and conspicuously glandular-serrulate, densely hirsute externally, glabrous within; corolla orange, oblique in calyx, not spurred, 11 mm. long, the tube cylindric, about 3 mm. broad, gradually enlarged to throat, densely pilose externally, glabrous and eglandular within, the throat about 4 mm. broad, the limb terminal, about 5 mm. broad, the lobes suborbicular, subequal, glabrous, not ciliate; androecium glabrous; ovary sparsely pilose at apex; style pilosulous; disk annular, glabrous.

Type in the U. S. National Herbarium, No. 1,795,458, collected at Hoya del Río Tambito, Cerro de Munchique, Cordillera Occidental, Department of El Cauca, Colombia, at 2,000–2,500 meters elevation, July 16, 1939, by E. Pérez Arbeláez and J. Cuatrecasas (No. 6269).

The present species is probably related to *Besleria cinnabarina* Fritsch, which agrees in most characters, especially in the corollas being gradually enlarged to the throat, rather than contracted. It differs, however, in its serrulate (rather than entire) calyx lobes and relatively small, subequal corolla lobes.

Besleria subcoriacea Morton, sp. nov.

Suffrutex; caules non ramosi, tomentosi; lamina foliorum subcoriacea, ovata vel ovato-lanceolata, breviter petiolata, acuta, integra, basi decurrens, subtus in venis et venulis tomentosa, venis primariis ca. 8-jugis, secundariis subtus perspicue reticulatis; flos solitarius, longe pedunculatus; calycis lobi inaequales, ovati vel ovato-oblongi, posticus deflexus, omnes rotundati, non mucronati, externe subtomentosi; corolla horizontalis, basi longe calcarata, tubo inflato, limbo terminali, valde bilabiato.

Terrestrial subshrub about 45 cm. high, with an elongate taproot; stem unbranched, about 5 mm. in diameter, terete, densely tomentose; leaves about 3 pairs, subequal, short-petiolate, the petiole about 1 cm. long, thick, densely tomentose; leaf blades ovate to ovate-lanceolate, 12–16 cm. long, 6.5–7.5 cm. broad, merely acute, cuneate at base, decurrent into petiole, entire, subcoriaceous, subconcolorous, glabrous above, densely tomentose on veins and veinlets beneath, the primary veins about 9 pairs, the secondary obscure above, prominently retic-

ulate beneath; flower solitary, axillary, the thick, tomentose peduncle about 2.3 cm. long; calyx lobes nearly free, unequal, the lateral and anterior pairs broadly ovate, about 15 mm. long and 11 mm. broad, the posterior one deflexed, ovate-oblong, about 17 mm. long, 10 mm. broad, all rounded at apex, not mucronate, subcoriaceous, pilose externally; corolla light pink (teste Killip), about 7 cm. long, horizontal in calyx, conspicuously curved, long-spurred at posterior base (the spur over 2 cm. long, acute, exserted from calyx), the tube prominently ventricose, becoming 1.8 cm. broad, sparsely pilosulous externally, a little contracted in throat, the limb terminal but facing upward, conspicuously bilabiate, the anterior lobes scarcely half as long as the posterior.

Type in the U. S. National Herbarium, No. 1,770,425, collected at Bahía Solano, in dense forest along Quebrada Jellita, Intendencia of El Chocó, Colombia, at 50–100 meters elevation, February 22, 1939, by E. P. Killip and H. García (No. 33486).

This is a remarkable plant, belonging to section *Neobesleria*, subsection *Herbaceae*, which I proposed for the single species *B. herbacea* Morton, known only from El Cauca, Colombia. These two are unlike the usual Beslerias in several ways. They are small, unbranched subshrubs, almost herbaceous in fact, whereas most Beslerias are definitely shrubby or even arborescent. The flowers are solitary, a very unusual condition in the genus. The corollas are the most distinctive feature, these being large (3.5–7 cm. long), conspicuously curved, borne horizontally in the calyx, and long-spurred at base. The limb is conspicuously bilabiate.

The two species may be separated as follows:

Leaf blades membranaceous, serrate, hirsute on the veins beneath, the secondary veinlets inconspicuous; petioles elongate, slender; corolla spur rounded; calyx lobes 6–8 mm. broad ---------- **B. herbacea**

Leaf blades subcoriaceous, entire, tomentose on the veins beneath, the secondary veins prominently reticulate beneath; petioles short, thick; corolla spur acute; calyx lobes 10–11 mm. broad ---------- **B. subcoriacea**

Besleria subdecurrens Morton, sp. nov.

Arbor parva, ramulis strigosis; folia breviter petiolata, laminis obovatis, magnis, integris, supra glabris, subtus in venis strigillosis, venis primariis 7–9-jugis; flores in axillis foliorum aggregati; calycis lobi lanceolati, acuminati, integri, externe strigosi, intus glabri; corolla erecta, ecalcarata, externe fere glabra, intus glabra, limbo regulari; filamenta glabra; ovarium puberulum; stylus puberulus; discus semiannularis.

Tree 3.6 meters high; ultimate branchlets quadrangular, 6 mm. in diameter, densely strigose; leaves opposite, equal; petioles about 3 cm. long, thick, strigose; leaf blades obovate, large, about 23 cm. long, 11.5–12.5 cm. broad, abruptly and very shortly acuminate (5 mm.), narrowed toward base and decurrent into petiole, chartaceous, entire, the margins revolute, subconcolorous, glabrous above, essentially glabrous beneath except for the minutely strigillose midrib and principal veins, the primary veins 7–9 pairs; common peduncle obsolete, the pedicels numerous, aggregate in the leaf axils, slender, about 12 mm. long, sparsely strigose; calyx lobes free, lanceolate, subequal, about 8 mm. long, 2 mm. broad, sharply acuminate, entire, strigose without, glabrous within; corolla red (teste Wedel), 16–18 mm. long, slightly oblique in calyx, not spurred at base, the tube about 2 mm. broad at base, cylindric, slightly ventricose toward throat, becoming 4 mm. broad, slightly contracted in throat, nearly glabrous externally (microscopically puberulous), glabrous within, eglandular in throat, the limb 7–8 mm. broad, the lobes spreading, subequal, rotund, puberulous externally; filaments connate about 4 mm. at base, slender, glabrous; anthers persistently connate in pairs; stamino-

dium well developed; ovary and style minutely puberulous; stigma conspicuously bilobed; disk semiannular, interrupted anteriorly, glabrous.

Type in the U. S. National Herbarium, No. 1,823,793, collected at Old Bank Island, Chiriquí Lagoon, Province of Bocas del Toro, Panama, January 31, 1941, by H. von Wedel (No. 1926).

Besleria subdecurrens belongs in *Eubesleria*, subsection *Confertae*. The most closely related species is probably *B. membranacea* Morton, known only from the Amazonian watershed of Peru. That species differs in its elongate petioles (up to 11.5 cm. long), leaf blades not broadest above middle and not narrowed toward base, glabrous ovary, and wholly annular disk.

Besleria tambensis Morton.

COLOMBIA: Istmina, on Río San Juan, El Chocó, alt. 75 meters, *Killip* 35459. Previously known only from the type from La Costa, El Cauca, Colombia.

Besleria variabilis Morton.

COLOMBIA: Near San Antonio on Río Güamués, Comisaría del Putumayo, alt. 270–310 meters, *Cuatrecasas* 11226.

Previously known only from eastern Peru.

Besleria ventricosa Morton, sp. nov.

Caules longe hirsuti; petioli elongati, hirsuti; lamina foliorum late ovata, acuta, basi truncata, denticulata, membranacea, utrinque dense hirsuta, venis primariis 13–15-jugis; pedicelli solitarii, axillares, breves; calycis lobi lineari-lanceolati, inaequales, longe acuminati, integri, externe hirsuti, intus glabri; corolla erecta, ecalcarata, tubo valde ventricoso, faucem versus contracto, externe piloso, intus basi annulum pilosum gerente, superne glabro, limbo terminali, parvo, regulari; filamenta basi pubescentia; ovarium glabrum; stylus glaber; stigma pilosum; discus semiannularis, glaber.

Stems sparingly branched, the upper about 5 mm. in diameter, the lower about 7 mm., long-hirsute, the hairs colorless, stiff, jointed; petioles elongate, up to 4 cm. long, densely hirsute; leaf blades broadly ovate, about 8 cm. long, about 6.5 cm. broad, acute, truncate and very broad at base, remotely denticulate, membranaceous, densely hirsute above, hirsute on the veins beneath, the primary veins 13–15 pairs, the secondary inconspicuous; flowers solitary, axillary, the peduncle obsolete, the pedicel slender, about 10 mm. long, hirsute; calyx lobes linear-lanceolate, unequal, slightly connate at base, 8–11 mm. long, 1.5–2 mm. broad, erect, long-acuminate, entire, densely long-hirsute externally, glabrous within; corolla orange, erect in calyx, a little gibbous posteriorly but not spurred, the tube about 5 mm. broad at base, conspicuously curved upwardly and ventricose, becoming 7 mm. broad, contracted to throat, pilose externally except toward base, pilose within in a ring at insertion of filaments, the throat about 5 mm. broad, glabrous and eglandular within, the limb terminal, small, subregular, the lobes pilose externally, glabrous within; filaments hairy at base; anthers glabrous; ovary and style glabrous; stigma pilose; disk gland semiannular, glabrous.

Type in the U. S. National Herbarium, No. 1,795,254, collected at Hoya del Río Tambito, Cerro de Munchique, Cordillera Occidental, Department of El Cauca, Colombia, at 2,000–2,500 meters elevation, July 16, 1939, by E. Pérez Arbeláez and J. Cuatrecasas (No. 6218). A second specimen was collected on Mount Derrumbo, El Cauca, Colombia, alt. 2,500–2,900 meters, July 1, 1922, by E. P. Killip (No. 7996).

In my revision of the genus, *Killip* 7996 was referred with a query to *B. riparia* Morton, and the description of that species contains some of its characters. The excellent specimen since collected by Pérez and Cuatrecasas shows the two to be distinct. They may be separated as follows:

Leaf blades broadly elliptic, cuneate at base, sparingly hirsute above, the primary veins about 8 pairs; disk annular; style puberulous---------- **B. riparia**
Leaf blades broadly ovate, truncate at base, densely hirsute above, the primary veins 13–15 pairs; disk semiannular; style glabrous------ **B. ventricosa**

A REVISION OF CREMOSPERMA

Until 1935 Bentham's genus *Cremosperma* (Gesneriaceae) was known from a single species. At that time I published a paper [7] keying and describing a total of ten species, one of which (*C. cinnabarinum*) I subsequently (1938) excluded from the genus. Recent collections have disclosed additional species, and I now know 17, all from Colombia and Ecuador.

Five new species are here described and additional collections of previously known species are listed. Bentham's original species, *C. hirsutissimum*, was known only from the type collections for over 90 years, until Kjell von Sneidern found it again in the same general region in 1935. The other species are almost equally rare and local.

KEY TO SPECIES

Calyx lobes glabrous (except for the cilia in one species). Lead blades rounded at apex, subcordate at base.
Common peduncle glabrous; calyx lobes not ciliate; leaf blades glabrous above; corolla yellow; disk semiannular---------- **1. C. rotundatum**
Common peduncle hirsute; calyx lobes ciliate; leaf blades hirsute above; corolla reddish; disk annular---------- **2. C. jucundum**
Calyx lobes pubescent.
Leaves of a pair unequal, the smaller much reduced; corolla tube scarcely ampliate.
Calyx lobes linear-lanceolate, equaling the calyx tube; leaves sericeous-pilose above. Corolla white; disk annular---------- **3. C. cotejense**
Calyx lobes rotund or ovate-deltoid, much shorter than the tube; leaves glabrous or glabrescent above..
Smaller leaf of a pair suborbicular, rounded; corolla white; disk semiannular---------- **4. C. auriculatum**
Smaller leaf of a pair lanceolate, acute; corolla yellow; disk reduced to a posterior gland---------- **5. C. congruens**
Leaves of a pair equal or subequal; corolla tube often ampliate upwardly.
Corolla 5–10 mm. long.
Leaf blades densely appressed-strigose along veins beneath. Corolla white; calyx lobes linear-lanceolate, 2 mm. long; disk semiannular. **6. C. serratum**
Leaf blades hirsute or tomentose beneath.
Common peduncle glabrous or sparsely pilose; leaf blades glabrous above or sparsely pilose.
Corolla much exceeding calyx; calyx lobes 1 mm. long; leaf blades entire or with a few remote serrulations; disk annular; corolla yellow, 8–10 mm. long---------- **7. C. ignotum**
Corolla only slightly exceeding calyx; calyx lobes 2 mm. long or more; leaf blades regularly crenate; disk reduced to a solitary gland; corolla 7 mm. long---------- **8. C. sylvaticum**

[7] Journ. Washington Acad. Sci. **25**: 284–291. 1935, and *ibid.* **28**: 348. 1938.

Common peduncle conspicuously hirsute; leaf blades hirsute above. Disk annular.
Corolla white, 5 mm. long, the tube scarcely exserted from calyx; leaf blades densely hirsute above between the primary veins.
9. C. parviflorum
Corolla yellow, 8.5 mm. long, the tube obviously exserted; leaf blades uniformly hirsute above---------- **10. C. castroanum**
Corolla 12–17 mm. long.
Leaf blades elongate-tuberculate above. Calyx lobes linear-lanceolate, 5 mm. long, much exceeding the calyx tube; disk annular.
11. C. nobile
Leaf blades not tuberculate above.
Plants 30–60 cm. high; leaf blades 8–13 cm. long, not hirsute. Corolla yellow; disk annular---------- **12. C. cestroides**
Plants not over 25 cm. high; leaf blades not over 10 cm. long, hirsute.
Leaves mostly borne in whorls of 3 or 4. Corolla white; creeping rhizome not present---------- **13. C. pusillum**
Leaves opposite, not whorled.
Plants with stems arising from horizontal rhizome; leaf blades small, not over 3 cm. long and 1.8 cm. wide. Corolla white; calyx lobes linear-subulate, exceeding calyx tube- **14. C. demissum**
Plants without a rhizome; leaf blades larger.
Calyx 7–9 mm. long. Corolla yellow---- **15. C. hirsutissimum**
Calyx 5–5.5 mm. long.
Leaf blades suborbicular, rounded at apex; corolla white, slightly bilabiate, the lobes rather small (3 mm.).
16. C. album
Leaf blades broadly elliptic, acute; corolla yellow-orange, conspicuously bilabiate, the lobes large (5–7 mm.).
17. C. monticola

1. Cremosperma rotundatum Morton, sp. nov.

Herba parva, caulibus non ramosis, tomentosis; folia opposita, aequalia; petioli tomentosi, crassi; lamina foliorum ovalis, rotundata, basi subcordata, remote denticulata, supra glabra, subtus in venis tomentosa, venis primariis 5–6-jugis; pedunculus communis glaberrimus; flores numerosi, subumbellati, pedicellis glabris; calyx subcampanulatus, glaber, lobis suborbicularibus, quam tubo brevioribus, non ciliatis; corolla flava, tubo faucem versus valde ampliato; ovarium glabrum; discus semiannularis.

Terrestrial herb 30 cm. high or less, the stems unbranched, densely tomentose; leaves opposite, equal; petiole thick, up to 2 cm. long, tomentose; leaf blades oval, up to 12.5 cm. long and 7.3 cm. wide, rounded at apex, obliquely subcordate at base, membranaceous, nearly entire (remotely denticulate), glabrous and bright green above, whitish along midrib and principal veins beneath, the primary veins 5 or 6 pairs; common peduncle 1.5–5 cm. long, glabrous; flowers numerous, subumbellate, the pedicels about 5 mm. long, glabrous; calyx subcampanulate, 5 mm. long, glabrous on both sides, 10-costate, the tube 4 mm. long, the lobes equal, erect, suborbicular, 1 mm. long, 1.2 mm. wide, not ciliate; corolla pale yellow, about 15 mm. long, the tube pilosulous on both sides, gradually and conspicuously ampliate from a narrow base, becoming 6 mm. wide in throat, the limb about 8 mm. wide; ovary and style glabrous; disk semiannular.

Type in the U. S. National Herbarium, No. 1,772,123, collected between Quebrada Guarapo and Mandinga, south of Río Condoto, Intendencia of El Chocó, Colombia, altitude 120–180 meters, April 22–28, 1939, by E. P. Killip (No. 35411).

A second specimen was collected near junction of Río Condoto and Río San Juan, El Chocó, April 20, 1939, by E. P. Killip (No. 35114).

2. **Cremosperma jucundum** Morton, Journ. Washington Acad. Sci. **25**: 288. 1935.

COLOMBIA: Antioquia.

3. **Cremosperma cotejense** Morton, Journ. Washington Acad. Sci. **25**: 288. 1935.

COLOMBIA: Coteje on Río Timbiquí, El Cauca.

4. **Cremosperma auriculatum** Morton, Journ. Washington Acad. Sci. **28**: 349. 1938.

ECUADOR: Mount Abitagua.

5. **Cremosperma congruens** Morton, Journ. Washington Acad. Sci. **25**: 287. 1935.

COLOMBIA: Paime, Cundinamarca.

6. **Cremosperma serratum** Morton, sp. nov.

Herba parva, caulibus non ramosis, dense strigosis; folia opposita, aequalia; petioli longi, strigosi; lamina foliorum elliptica, acuta, basi cuneata, serrata, supra parce strigosa, subtus in venis dense strigosa, venis primariis 9–10-jugis; pedunculus communis elongatus, strigosus; flores numerosi, conferti, pedicellis brevissimis; calyx cylindricus, 10-costatus, externe dense appresso-hirsutus, lobis lineari-lanceolatis, quam tubo paullo brevioribus; corolla alba, tubo vix superne ampliato, sursum piloso, limbo parvo, bilabiato; ovarium glabrum; discus semiannularis.

Terrestrial herb about 25 cm. high; stems unbranched, densely strigose; leaves opposite, equal, long-petiolate, the petiole up to 2.5 cm. long, strigose; leaf blades elliptic, up to 8 cm. long and 4 cm. wide, acute, cuneate at base, membranaceous, serrate, sparsely strigose above, densely yellowish-strigose beneath on the veins and veinlets, the primary veins 9 or 10 pairs, elevated beneath; common peduncle 4.5 cm. long, strigose; flowers capitate, numerous, the pedicels very short (2 mm. long or less); calyx cylindric, 5 mm. long, 10-costate, densely appressed-hirsute, deeply 5-parted, the tube about 3 mm. long, the lobes linear-lanceolate, erect, connivent, 2 mm. long; corolla white, 6 mm. long, the tube about 1 mm. wide, scarcely ampliate upwardly, pilose externally at apex, the limb about 4 mm. wide, bilabiate, three lobes about 1.5 mm. long, the other two much smaller; ovary and style glabrous; disk semiannular.

Type in the U. S. National Herbarium, No. 1,771,974, collected on ridge along Yeracüí Valley, upper Río San Juan, Intendencia of El Chocó, Colombia, altitude 200–275 meters, April 24, 1939, by E. P. Killip (No. 35234).

7. **Cremosperma ignotum** Morton, Journ. Washington Acad. Sci. **25**: 289. 1935.

COLOMBIA: Dagua Valley, El Valle. A second collection is: Buenaventura El Valle, alt. 50 meters, *Killip & García* 33282.

8. **Cremosperma sylvaticum** Morton, Journ. Washington Acad. Sci. **28**: 348. 1938.

COLOMBIA: La Costa, El Cauca.

9. **Cremosperma parviflorum** Morton, sp. nov.

Herba parva, caulibus non ramosis, hirsutis; folia opposita, aequalia; lamina foliorum ovata vel ovato-elliptica, rotundata, basi oblique rotundata, crenata, supra inter venas primarias dense hirsuta, subtus ubique hirsuta, venis primariis ca. 6-jugis; pedunculus communis ca. 2 cm. longus, pedicellis brevissimis, numerosis; calyx cylindrico-turbinatus, 10-costatus, dense hirsutus, lobis oblongis; corolla alba, minuta, tubo cylindrico, externe glabro, intus piloso, limbo parvo, subregulari; ovarium glabrum; discus annularis.

Terrestrial herb about 25 cm. high; stems unbranched, appressed-hirsute, the hairs many-celled, reddish; leaves opposite, subequal, long-petiolate, the petioles about 2 mm. long, hirsute; leaf blades ovate or ovate-elliptic, up to 8 cm. long and 4.5 cm. wide, rounded at apex, obliquely rounded at base, regularly crenate, membranaceous, hirsute all over, the hairs reddish, the primary veins about 6 pairs; common peduncle 2 cm. long, hirsute; flowers capitate, numerous, densely crowded, the pedicels obsolete; calyx cylindric-turbinate, 4.2 mm. long, 10-costate, densely hirsute externally, the tube about 3 mm. long, glabrous within, the lobes oblong, subequal, erect, obtuse, glabrous within; corolla white, minute, about 5 mm. long, the tube about 1 mm. wide, cylindric, not ampliate in throat, glabrous externally, pilose within, the limb about 3 mm. wide, the lobes subequal, spreading, ovate-oblong, pilosulous externally, glandular within at base; filaments inserted in middle of corolla tube, free from each other; anthers connate; ovary and style glabrous; disk high, annular, glabrous.

Type in the U. S. National Herbarium, No. 1,770,368, collected at Córdoba, Department of El Valle, Colombia, altitude 50–100 meters, February 17, 1939, by E. P. Killip and H. García (No. 33423).

10. Cremosperma castroanum Morton, Journ. Washington Acad. Sci. **25**: 289. 1935.

COLOMBIA: Quibdó, El Chocó. Recent collections are: Between Quebrada Guarapo and Mandinga, El Chocó, *Killip* 35148; Istmina, El Chocó, *Killip* 35461; Gorgona Island, Nariño, *Killip & García* 33179.

11. Cremosperma nobile Morton, Journ. Washington Acad. Sci. **25**: 290. 1935.

COLOMBIA: Armada, Nariño.

12. Cremosperma cestroides (Fritsch) Morton, Journ. Washington Acad. Sci. **28**: 348. 1938.

Besleria cestroides Fritsch, Notizbl. Bot. Gart. Berlin **11**: 962. 1934.

COLOMBIA: Guadalito, Antioquia.

13. Cremosperma pusillum Morton, Journ. Washington Acad. Sci. **25**: 287. 1935.

COLOMBIA: Tambo de Savanilla, Nariño (?); Antioquia.

13a. Cremosperma pusillum var. **ecuadorense** Morton, Journ. Washington Acad. Sci. **25**: 287. 1935.

ECUADOR: Mount Pichincha.

14. Cremosperma demissum Morton, sp. nov.

Herba parva; rhizoma horizontale, elongatum; caules erecti, non ramosi, hirsuti; folia opposita, aequalia; petioli hirsuti; lamina foliorum oblique ovata, parva, rotundata, serrata, utrinque sparse hirsuta, venis primariis 4–5-jugis; pedunculus communis 13 mm. longus, pedicellis paucis; calyx cylindricus, 10-costatus, hirsutus, lobis quam tubo longioribus, lineari-subulatis; corolla alba, tubo apicem versus valde ampliato, limbo magno, patente, lobis inaequalibus magnis; ovarium glabrum; discus annularis.

Terrestrial herb with horizontal underground rhizome emitting at intervals erect, unbranched stems less than 10 cm. long, these hirsute; leaves opposite, equal; petioles up to 1 cm. long, hirsute; blades obliquely ovate, up to 3 cm. long and 1.8 cm. wide, rounded at apex, obtuse or rounded at base, membranous, serrate, sparsely hirsute on both sides, the primary veins 4 or 5 pairs; common peduncle about 13 mm. long, hirsute; flowers about 4 to a peduncle, the pedicels 2–3 mm. long, hirsute; calyx cylindric, about 7 mm. long, 10-costate, hirsute externally, glabrous within, deeply 5-parted, the tube about 3 mm. long, the lobes equal, erect, linear-subulate, attenuate; corolla white, 15 mm. long, the tube about 1 mm. wide at base, much enlarged toward throat, appressed-pilose externally,

glabrous within, the throat 6–7 mm. wide, the limb about 9 mm. wide, the lobes unequal, spreading, large, 3–3.5 mm. long; filaments inserted in middle of corolla tube, glabrous; ovary and style glabrous; disk annular.

Type in the U. S. National Herbarium, No. 1,775,527, collected in the vicinity of Puyo, Province of Napo-Pastaza, Ecuador, altitude 750–1,000 meters, September 1939, by A. F. Skutch (No. 4512).

15. Cremosperma hirsutissimum Benth. Pl. Hartw. 234. 1846.

COLOMBIA: Popayán, El Cauca. Additional collections are: La Costa, Distr. El Tambo, El Cauca, altitude 1,500 meters, *von Sneidern* 483; Cali, El Valle, *Figueroa* 894.

16. Cremosperma album Morton, Journ. Washington Acad. Sci. **25**: 290. 1935.

COLOMBIA: Dagua Valley, El Valle; El Chocó. A specimen not previously reported is: Buenaventura, El Valle, altitude 50 meters, *Killip & Garcia* 33251.

17. Cremosperma monticola Morton, sp. nov.

Herba parva, caulibus hirsutis; folia opposita, subaequalia, longe petiolata; petioli hirsuti; lamina foliorum late elliptica, acuta, perspicue serrata, membranacea, supra inter venas primarias hirsuta, subtus praecipue in venis hirsuta, venis primariis 7–8-jugis; pedunculus communis elongatus, pedicellis paucis, hirsutis; calyx cylindricus, 10-costatus, hirsutus, lobis deltoideis, parvis; corolla aurantiaca, tubo cylindrico, apice pilosulo, limbo magno, bilabiato, lobis magnis, inaequalibus, duobus deltoideis, acutis, tribus suborbicularibus, basi connatis, rotundatis; ovarium glabrum; discus semiannularis.

Herb about 25 cm. high; stems unbranched, densely long-hirsute; leaves opposite, subequal, long-petiolate, the petiole up to 2.6 cm. long, one-fourth as long to nearly equaling the blade, hirsute; leaf blades broadly elliptic, up to 10 cm. long and 5 cm. wide, acute, obliquely rounded at base, membranaceous, conspicuously serrate except at very base, concolorous, hirsute above between the primary veins (the veins themselves glabrous), hirsute beneath, especially on the primary veins, these 7 or 8 pairs, elevated beneath; common peduncle elongate, 4.5–6.5 cm. long, slender, sparsely hirsute; pedicels about 5, subumbellate, 5–6 mm. long, sparingly long-hirsute; calyx cylindric, green, about 5 mm. long, the tube 10-costate, 4 mm. long, sparsely hirsute externally, glabrous within, the lobes deltoid, equal, 1 mm. long, not ciliate; corolla brilliant yellow-orange (teste Cuatrecasas), about 17 mm. long, the tube cylindric, 1 cm. long, 2 mm. broad, pilosulous at apex, not enlarged toward throat, pilosulous within throat, the limb strongly bilabiate, 12–15 mm. broad, three of the lobes very large, spreading, united at base, suborbicular, about 7 mm. long, rounded at apex, the other two erect or deflexed, deltoid, about 5 mm. long, acute, all pilosulous externally, glabrous within; filaments inserted high in corolla tube, free from each other, glabrous; anthers connate, glabrous; ovary and style glabrous; disk semi-annular.

Type in the U. S. National Herbarium, No. 1,796,349, collected at Quebrada del Río Hacha, Cordillera Oriental, Territorio of Caquetá, Colombia, altitude 2,100–2,250 meters, March 23, 1940, by J. Cuatrecasas (No. 8552).

NEW SPECIES OF GUATEMALAN GESNERIACEAE

The following five new species were detected during the course of identifying the large Guatemalan collections of Gesneriaceae made by Paul C. Standley and Julian A. Steyermark. They are based partly on older collections previously misidentified.

Alloplectus cucullatus Morton, sp. nov.

Frutex, caulibus vix ramosis, hirsutis; folia aequalia, longe petiolata; lamina foliorum elliptica, magna, breviter acuminata, basi cuneata, subtus viridis, serrulata, supra appresso-pilosa, subtus hirsuta, venis primariis 8–9-jugis; flores in axillis aggregati, pedicellis gracilibus; calyx ruber, lobis liberis, inaequalibus, suborbicularibus, concavis, apice cucullatis, subulato-fimbriatis, medio utrinque hirsutis; corolla rubra, horizontalis, basi calcarata, tubo longe hirsuto, faucem versus ampliato, limbo obliquo; ovarium dense hirsutum; stylus glaber; discus in glandulam posticam reductus.

Shrub 1.2–3.6 meters high; stems sparingly or not at all branched, 4–9 mm. in diameter, densely hirsute toward apex; leaves opposite, equal, long-petiolate, the petiole up to 10 cm. long, hirsute; leaf blades elliptic, large, up to 30 cm. long and 12 cm. broad, short-acuminate, cuneate at base, chartaceous, green beneath, inconspicuously serrulate, appressed-pilose above, hirsute beneath, the primary veins 8 or 9 pairs; flowers aggregate in the leaf axils, a common peduncle lacking, the pedicels slender, up to 4 cm. long, hirsute; bracts small, ovate, soon deciduous; calyx red, the lobes free, unequal, four subequal, suborbicular, about 2 cm. long, over 2 cm. broad, the posterior smaller, all concave, prominently curved and cucullate at apex, subulate-toothed (the teeth about 15 to a side), densely yellow-hirsute near the middle on both sides; corolla red, 4.5–5 cm. long, horizontal in calyx, short-spurred at base, the tube cylindric, 5.5–6 mm. broad, densely long-hirsute externally, glabrous within, enlarged toward throat, this about 12 mm. broad, glandular within, the limb oblique, 15–16 mm. broad, the lobes unequal, glabrous within; filaments connate at base for 6 to 7 mm., glabrous, slender; anthers much broader than long, 1.5–2 mm. long, 3 mm. broad, the cells distinct, suborbicular, fully dehiscent; ovary densely hirsute; style glabrous; disk a large glabrous, posterior gland.

Type in the U. S. National Herbarium, No. 1,637,938, collected at "Zona Reyna," Department of Quiché, Guatemala, at 750–900 meters elevation, December 2, 1934, by A. F. Skutch (No. 1812).

ADDITIONAL SPECIMENS EXAMINED:

MEXICO: Tumbala, Chiapas, alt. 1,200–1,650 meters, *Nelson* 3352.

GUATEMALA: Between Sepacuité and Secanquim, Alta Verapaz, alt. 1,100 meters, *Pittier* 319. Sachichá, Alta Verapaz, alt. 1,000 meters, *von Tuerckheim* II 981 (Donn. Smith 8721). Finca Sepacuité, Alta Verapaz, *Cook & Griggs* 261. Secanquim, Alta Verapaz, *Goll* 160. Between Finca Chimoté and Finca Cubilgüitz, Alta Verapaz, alt. 300–500 meters, *Steyermark* 44191. Yalambo, Huehuetenango, *Seler* 3218. Maxbal, Sierra de los Cuchumatanes, Huehuetenango, alt. 1,500 meters, *Steyermark* 48871. Cerro Huitz, Huehuetenango, *Steyermark* 48609.

These specimens have mostly been identified previously as *A. tetragonus* (Oerst.) Hanst., a common Costa Rican species. The Chiapas specimen cited above forms the basis for the report of *A. tetragonus* from Mexico in Standley's "Trees and Shrubs of Mexico." Undoubtedly *A. cucullatus* is closely related to *A. tetragonus*, but the calyx lobes are very different. In *A. tetragonus* they are ovate, plane, and acute at apex. In the present species they are suborbicular and concave, the apex being outwardly curved and hood-shaped. It is impossible to flatten out the lobes without cutting them.

Although in this genus pubescence is usually a good specific character, being correlated with other differences, I consider the following collections to represent no more than a variety, which has pubescence of a strigose rather than a hirsute type.

Alloplectus cucullatus var. **substrigosus** Morton, var. nov.

A var. *typica* caulibus strigosis, foliis subtus praecipue in venis substrigosis differt.

Stems densely strigose; leaf blades substrigose beneath, especially on the veins.

Type in the U. S. National Herbarium, No. 1,336,494, collected at Pansamalá, Department of Alta Verapaz, Guatemala, at 1,060 meters elevation, June 1885, by H. von Tuerckheim (No. 733).

ADDITIONAL SPECIMENS EXAMINED:

GUATEMALA: Finca Mocca, Alta Verapaz, *H. Johnson* 166. Mountains between Tactic and Tamahú. Alta Verapaz, alt. 1,500–1,600 meters, *Standley* 90619.

Alloplectus guatemalensis Morton, sp. nov.

Planta epiphytica, caulibus dense breviter pilosulis, demum glabrescentibus; folia inaequalia, conformia; petioli non corrugati; lamina foliorum late oblanceolata, breviter acuminata, basi cuneata, membranacea, subtus viridis, integra, utrinque sparse strigillosa, venis primariis 8-jugis; pedicelli breves, breviter pilosuli; calycis lobi ovati, attenuati, basi cordati, integri, utrinque sparse strigillosi; corolla obliqua, subcalcarata, alba, lobis flavis, tubo crasso, fere glabro, limbo magno, lobis suberosis et undulatis; antherae oblongae, sagittatae, basi dehiscentes; ovarium dense pubescens; stylus pilosulus; discus in glandulam lobatam posticam reductus.

Woody epiphyte; stems little branched, ridged, straw-color, the younger densely short-pilosulous, the older glabrescent; leaf blades opposite, somewhat unequal but conform, short-petiolate, the petiole 10–15 mm. long, not corrugate, short-pilosulous; leaf blades broadly oblanceolate, up to 16 cm. long and 5 cm. broad, short-acuminate, cuneate at base, membranaceous, entire, sparsely and minutely strigillose on both sides, green beneath, the primary veins 8 pairs, the midrib not corrugate; flowers aggregate in the leaf axils, the pedicels 2 or 3, (or rarely the flowers solitary), 7–15 mm. long, densely short-pilosulous; bracts deciduous; calyx pale green, suffused throughout or at base only with rose-red, the lobes ovate, erect, subequal (the posterior somewhat shorter and broader), 22–25 mm. long, 10–14 mm. broad near base, connate at base, subcordate (the basal lobes spreading outwardly, making the calyx angular at base), sharply long-attenuate at apex, entire, sparsely strigillose on both sides, ciliolate; corolla cream-white, the lobes pale yellow outside, deeper yellow within (teste Steyermark), 3.4–4.1 cm. long, oblique in calyx, subcalcarate at posterior base, the tube subcylindric, not ventricose, 13–15 mm. broad, nearly glabrous without (bearing a few, fine, scattered, appressed hairs), glandular within, scarcely if at all contracted in throat, the limb 2–2.2 cm. broad, the lobes low and broad, subequal, spreading, glabrous or nearly so, not fimbriate or ciliate, suberose and a little undulate; filaments connate into a conspicuous sheath at base, glabrous, flattened; anthers oblong, 5.1 mm. long, 2.5 mm. broad, connate, sagittate at base, the cells discrete, parallel, dehiscent only at basal end; ovary densely tomentose; style sparsely pilosulous; disk reduced to a lobed, glabrous, posterior gland.

Type in Field Museum of Natural History, No. 1,058,748, collected at Finca El Porvenir on Cerro de Mono, southern slopes of Volcán Tajumulco, Department of San Marcos, Guatemala, at 1,400–1,700 meters elevation, March 9, 1940, by J. A. Steyermark (No. 37403); isotype in the U. S. National Herbarium.

I describe this as an *Alloplectus* because of its obvious affinity with the Mexican *Alloplectus strigosus* (Oerst.) Hanst. However, these two species are among those that perhaps show a closer relationship with *Drymonia* than with *Alloplectus* proper. The correct generic disposition must await future studies. From *A. strigosus*, the present species differs in its much broader corolla tube (this only

7–9 mm. broad in *A. strigosus*) and in the smooth petioles and midribs of the leaf blades, these conspicuously corrugate in *A. strigosus*.

The Guatemalan species *A. oinochrophyllus* Donn. Smith is also closely related but is distinguished by its definitely long-hirsute stems and smaller, thicker leaf blades, these being red on the lower surface.

Columnea vinacea Morton, sp. nov.

Caules non ramosi, hirsuti; folia opposita, aequalia; lamina foliorum elliptico-oblonga, acuta vel acuminata, basi cuneata, serrulata, membranacea, supra pilosa, subtus vinacea, hirsuta, venis primariis 7–9-jugis; flores pauci, axillares; pedicelli breves, hirsuti; calycis lobi liberi, erecti, aequales, lineari-lanceolati, acuminati, basi non angustati, subulato-dentati, utrinque hirsuti; corolla flava, erecta, ecalcarata, tubulosa, tubo medio ventricoso, externe hirsuto, faucem versus contracto, limbo subregulari, parvo; antherae quadratae; ovarium pilosum; disci glandulae 5, 2 posticae connatae, majores, 3 anticae liberae, minores.

Epiphyte, 35 cm. long or less; stems unbranched, about 4 mm. in diameter, hirsute at apex, the internodes very short, the nodes thickened with very large leaf scars; leaves opposite, equal; petiole up to 2 cm. long, hirsute; leaf blades elliptic-oblong, up to 18 cm. long and 7 cm. broad, acute or acuminate, subequally cuneate at base, conspicuously serrulate, thin-membranaceous, green and pilose above, red all over beneath, subappressed-hirsutulous beneath, especially on the veins, the primary veins 7–9 pairs; flowers few, axillary, short-pedicellate, the pedicels up to 1.7 cm. long, brown-hirsute; calyx lobes erect, equal, linear-lanceolate, about 10 mm. long, 2 mm. broad, acuminate, not narrowed toward base, subulate-toothed (the teeth 2 or 3 to each side, up to 2.5 mm. long, 0.25 mm. broad), hirsute on both sides; corolla yellow, erect in calyx, not spurred, 4 cm. long, the tube 4 mm.broad at base, slightly ventricose in middle (8 mm. broad), contracted in throat (5 mm broad), densely hirsute without, sparsely hairy within, the limb subregular, 10 mm. broad, the lobes slightly unequal, the larger suborbicular, 5 mm. long and broad, slightly undulate, not fimbriate, not ciliate, glabrous within; filaments glabrous; anthers quadrate, 2 mm. long and broad, dehiscing throughout; ovary densely pilose; disk glands 5, the two posterior connate.

Type in the U. S. National Herbarium, No. 1,841,834, collected on south slopes of Volcán Atitlán, Department of Sololá, Guatemala, June 11, 1942, by J. A. Steyermark (No. 47408).

ADDITIONAL SPECIMENS EXAMINED:

GUATEMALA: Barranco Eminencia, above San Rafael de la Cuesta, San Marcos, alt. 2,100–2,400 meters, *Standley* 68656. Volcán Santa Clara, Suchitepéquez, *Steyermark* 46698. ?Volcán Jumay, Jalapa, *Steyermark* 32327.

Only one species of the small section *Stygnanthe* has previously been known from North America, *C. calotricha* Donn. Smith, the type of which came from Cubilgüitz, Alta Verapaz, Guatemala. Although not found again in Guatemala, it has been collected once in Costa Rica. *Stygnanthe* has the nearly regular, only slightly bilabiate corolla of section *Collandra*, but the equal leaves of *Eucolumnea*. The two species differ as follows:

Calyx lobes spatulate, rounded at apex, narrowed at base, entire; disk gland solitary ..... **C. calotricha**

Calyx lobes linear-lanceolate, acuminate at apex, not narrowed at base, remotely subulate-toothed; disk composed of 2 large, connate posterior glands and 3 smaller anterior glands ..... **C. vinacea**

Columnea viridis Morton, sp. nov.

Caules non ramosi, crassi, dense hirsuti; folia valde inaequalia, minora auriculiformia, subsessilia, majora oblanceolata, magna, breviter acuminata, basi

obliqua, remote denticulata, membranacea, utrinque hirsuta, non rubromaculata, venis primariis 8–9-jugis; flores axillares, breviter pedicellati; bracteae virides, lanceolatae, subulato-dentatae, hirsutae; calycis lobi liberi, erecti, lineari-lanceolati, longe attenuati, subulato-dentati, virides, utrinque dense hirsuti; corolla tubulosa, erecta, ecalcarata, dense hirsuta, calyce vix longior, limbo regulari, parvo; antherae quadratae; ovarium hirsutum; stylus glaber; discus in glandulam glabram posticam reductus.

Epiphyte; stems unbranched, 7 mm. in diameter, densely hirsute; leaves opposite, strongly unequal, the larger of a pair oblanceolate, up to 25 cm. long and 6.7 cm. broad, abruptly short-acuminate, strongly unequal at base, the upper base cuneate, the lower rounded, thick-membranaceous, inconspicuously denticulate, dark green above, paler beneath, not red-spotted, hirsute on both sides, the primary veins 8 or 9 pairs; petioles short, about 1 cm. long, densely hirsute; smaller leaves of a pair auriculiform, lanceolate, about 2 cm. long, long-attenuate at apex, subsessile, hirsute on both sides; flowers 1 or 2 in an axil, very short-pedicellate; bracts ovate-lanceolate, about 18 mm. long, 6 mm. broad, long-attenuate, subulate-toothed, green, densely hirsute on both sides; calyx lobes free, erect, subequal, linear-lanceolate, about 18 mm. long, 3 mm. broad, long-acuminate, subulate-toothed (the teeth 4 or 5 to a side, up to 3 mm. long and 0.3 mm. broad), green, densely long-hirsute, the hairs rose-red (teste Steyermark); corolla yellow or orange-red, erect in calyx, not spurred at base, about 2 cm. long, the tube cylindric, about 5 mm. thick, not or scarcely ventricose, densely red-hirsute without, glabrous within, slightly narrowed toward throat, the limb not wider than the tube, subregular, the lobes about 2 mm. long, glabrous within, hirsute without; filaments connate about 4 mm. at base, glabrous; anthers quadrate, about 1.5 mm. long and broad, dehiscent throughout, connate in pairs; ovary sparsely hirsute; style glabrous; disk reduced to a truncate, glabrous, posterior gland.

Type in the U. S. National Herbarium, No. 860,535, collected at Sepacuité, Department of Alta Verapaz, Guatemala, December 15, 1904, by George P. Goll (No. 187).

ADDITIONAL SPECIMENS EXAMINED:

GUATEMALA: Cubilgüitz, Alta Verapaz, alt. 350 meters, *von Tuerckheim* II. 58 (Donn Smith 7641). Pansamalá, Alta Verapaz, alt. 1,250 meters, *von Tuerckheim* 1272. Between San Cristobal Verapaz and Chixoy, Alta Verapaz, alt. 1,200–1,300 meters, *Steyermark* 43920. Cobán, Alta Verapaz, *Standley* 71659. Pantín, below Tamahú, Alta Verapaz, alt. 600 meters, *Standley* 70545. Cerro Victoria, Sierra de los Cuchumatanes, Huehuetenango, alt. 800 meters, *Steyermark* 49640. Cerro Chiblac, Sierra de los Cuchumatanes, Huehuetenango, alt. 1,800–2,000 meters, *Steyermark* 49445. Between Bananera and La Presa, Montaña del Mico, Izabal, alt. 40–300 meters, *Steyermark* 38191.

BRITISH HONDURAS: Camp 33, alt. 840 meters, *Schipp* S683.

Columnea viridis is closely allied to the Costa Rican *C. purpurata* Hanst. and has usually been so identified. That species has, however, much larger calyx lobes and bracts, bright red in color. In *C. viridis* the bracts and calyx lobes are green. The hairs of the inflorescence are said to be red, but they are brownish in dried specimens, whereas in *C. purpurata* they are persistently red.

Napeanthus bracteatus Morton, sp. nov.

Herba acaulescens, caulibus perbrevibus; folia numerosa, rosulata, oblanceolata, magna, acuta, deorsum attenuata, basi subcordata, membranacea, denticulata, supra strigillosa, subtus praecipue in venis subtomentosa, venis primariis ca. 15-jugis; pedunculus communis elongatus, bibracteatus, bracteis foliaceis, magnis, pedicellis 2–5, subglabratis, elongatis; calycis lobi liberi, lanceolati,

acuminati, integri, demum perspicue venosi et reticulati; corolla alba, campanulata, glabra, limbo magno, lobis patentibus, subinaequalibus; stamina 4, libera, corollae basi inserta; filamenta brevia, glabra; antherae loculi confluentes; ovarium glabrum; discus nullus.

Acaulescent herb from a thick taproot; stems not over 2 cm. long, the leaves densely crowded, rosulate; petioles very short or none; leaf blades oblanceolate, up to 26 cm. long and 7.5 cm. broad, usually somewhat smaller, acute, attenuate toward base, subcordate at very base, thin-membranaceous, denticulate, strigillose above, the hairs very delicate, tortuous, subtomentose beneath especially on the veins and veinlets, the primary veins about 15 pairs, arcuate and anastomosing toward margin; inflorescences numerous, basal, 10–14 cm. long, the common peduncle 5–10 cm. long, sparsely pilose, bibracteate at apex, the bracts green, foliaceous, herbaceous, ovate or ovate-lanceolate, 13–17 mm. long, 7–8 mm. broad, acute, entire, sparsely pilose on both sides; pedicels 2–5 from each peduncle, 2–5 cm. long, usually simple and 1-flowered, occasionally bibracteolate (the bracteoles similar to the bracts but smaller), nearly glabrous, very slender (about 0.25 mm. thick), straw-color; calyx lobes 5, free, lanceolate, equal, in flower about 9 mm. long, 2.5 mm. broad, acuminate, entire, membranaceous, inconspicuously veiny, sparsely pilose on both sides, ciliate, in fruit becoming thicker and conspicuously veiny, with 5 longitudinal nerves, connected here and there by cross veins; corolla white, campanulate, about 12 mm. long, the tube about 6 mm. long, glabrous on both sides, the limb slightly bilabiate, the lobes 6–7 mm. long, suborbicular, spreading, glabrous, not ciliate; stamens 4; filaments free from each other, inserted in base of corolla tube, about 2 mm. long, glabrous; anthers oblong, 1–1.5 mm. long, glabrous, the cells apically confluent; staminodium none; ovary and style glabrous; disk none.

Type in the U. S. National Herbarium, No. 408,323, collected at Secoyocté, near Finca Sepacuité, Department of Alta Verapaz, Guatemala, April 14, 1902, by O. F. Cook and R. F. Griggs (No. 614).

ADDITIONAL SPECIMENS EXAMINED:

GUATEMALA: Between Tactic and the divide on road to Tamahú, Alta Verapaz, alt. 1,500–1,600 meters, *Standley* 90621a, 90623. Mountains east of Tactic on road to Tamahú, *Standley* 71201.

Only two species of *Napeanthus* have been described from North America, *N. apodemus* Donn. Smith of Costa Rica and *N. saxicola* T. S. Brandeg. of Mexico. I have not seen a specimen of the latter, but from description I think it probable that the plant does not belong in this genus. The pedicels are described as ebracteate and axillary, not umbellate or racemose on an elongate, bracteate peduncle as in *Napeanthus*, and the anther cells are said to be distinct and not confluent as in *Napeanthus*. *N. apodemus* is a true *Napeanthus*, which may be distinguished as follows:

Bracts at apex of peduncle small, 5 mm. long or less; pedicels racemose, short; mature calyx lobes only about 5 mm. long; leaves entirely glabrous. **N. apodemus**

Bracts at apex of peduncle foliaceous, 13–17 mm. long; pedicels subumbellate, elongate; mature calyx lobes 9–10 mm. long; leaf blades strigillose above, densely tomentose on the veins beneath ..... **N. bracteatus**

The original species of the genus, *N. brasiliensis* Gardn., is known only from the Organ Mountains of Rio de Janeiro. *N. bracteatus* is very much closer to it than to *N. apodemus*. In habit the two are similar, but *N. brasiliensis* has smaller bracts (4 mm. long), relatively broader calyx lobes, and a rose-colored corolla.

SOME SOUTH AMERICAN SPECIES OF SOLANUM

The genus *Solanum* has not attracted the interest of botanists generally, and it has had few special students, the only modern authority on the genus as a whole being Dr. Georg Bitter, whose death prevented the completion of a projected monograph. That *Solanum* is reputed one of the most difficult genera is partly explained by the fact that it is one of the largest genera of plants. As early as 1852 Dunal had recognized 901 species. The Index Kewensis recognized about 987 species in 1895. Between 1895 and 1935 over 1,060 species were described. The total number of recognized species at present is well over 2,000. In addition there are a large number of synonyms, and many varieties have been proposed from time to time. Thus the total number of names to consider exceeds 3,000. Only a fraction of the species are represented in any one herbarium.

Some of the difficulties of the genus must, however, be attributed to its celebrated monographer, Michel Felix Dunal, the French botanist who devoted most of his life to a study of the Solanaceae. His first publication on the family was in 1811, and his researches culminated in his monograph published in 1852 in De Candolle's Prodromus. Dunal was a careful worker, and his descriptions are models of accuracy. His conceptions of relationships are not reliable, however, inasmuch as related species are often widely separated in his treatment. In fact, the same species is sometimes described under different names in different sections of the genus. The monograph is difficult to use because there is no key and because the descriptions are not contrasting and do not clearly bring out the differential characters. Anyone who attempts to identify an unknown specimen of *Solanum* by means of Dunal's monograph feels as if lost in a maze of words.

I began working on *Solanum* 15 years ago and have continued at intervals ever since. It is now my conviction that the study of *Solanum* is indeed a lifetime task. Since there are other problems having greater interest for me, I have given up my intention of preparing a revision of the South American species. I present here merely a few notes concerning the distribution and nomenclature of some of the rarer species, as well as a partial treatment of the section *Leiodendron* in Colombia and a brief synopsis of the South American species of section *Lycianthes*.

SOLANUM, subgenus PACHYSTEMONUM

Section ANARRICHOMENUM

Solanum evolvulifolium Greenm. ex Donn. Smith, Bot. Gaz. 37: 211. **1904.**

Type from La Palma, Costa Rica, *Pittier* 7413.

Previously known only from Costa Rica and Panama.

COLOMBIA: La Cumbre, El Valle, alt. 1,800–2,100 meters, *Pennell* 5714. Cerro de Munchique, El Cauca, 2,000–2,500 meters, *Pérez Arbeláez & Cuatrecasas* 6231.

Section ANTHORESIS

Solanum abutiloides (Griseb.) Bitter & Lillo, Repert. Sp. Nov. Fedde **12**: 136. 1913.

Cyphomandra abutiloides Griseb. Abh. Ges. Wiss. Göttingen **24**: 249. 1879.

Type from Jujuy, Argentina, *Lorentz*.

A rare species, apparently previously known only from the Province of Jujuy.

ARGENTINA (Prov. Salta): Quebrada de la Concha, alt. 1,300 meters, *Venturi* 9871. Campo Quijano, alt. 1,600 meters, *Venturi* 8051.

Solanum bogotense Dunal in DC. Prodr. **13**[1]: 121. 1852.

Type from Bogotá, Cundinamarca, Colombia, *Goudot* in 1846.

The following are new records for this little-known species:

COLOMBIA: Nevado del Cocuy, Boyacá, alt. 3,700 meters, *Cuatrecasas* 1307. Laguna de Cunta, Dept. Santander, alt. 3,800 meters, *Killip & Smith* 17969. Without locality, *Mutis* 1998.

From a photograph *Lehmann* 7566, from Páramo de la Pradera near Bogotá, alt. 2,500–3,000 meters, is the same. It bears a manuscript name of Bitter.

Solanum clematideum Bitter, Repert. Sp. Nov. Fedde **16**: 86. 1919.

Type from Pindilic, Prov. Cuenca, Ecuador, alt. 2,600–3,000 meters, *Lehmann* 4948.

To Bitter's description may be added that the berries are spherical, about 8 mm. in diameter, and dark purple-black at maturity.

The following are new records:

ECUADOR: Between Loja and San Lucas, Prov. Loja, alt. 2,100–2,600 meters, *Hitchcock* 21497. Between Ibarra and Tulcán, Prov. Carchí, alt. 3,000 meters, *Hitchcock* 20947. Island in Lake Cuicochi, Prov. Imbabura, alt. 3,100 meters, *Penland & Summers* 761. El Ilalo, Prov. Pichincha, alt. 3,150 meters, *Balls* 5826. Cumbe, *Rose, Pachano, & Rose* 22963.

Section CAMPANULISOLANUM

Solanum codonanthum Bitter, Repert. Sp. Nov. Fedde **11**: 235. 1912.

Type from Siambon, Sierra de Tucumán, Argentina, *Lorentz & Hieronymus* 818.

ADDITIONAL RECORDS:

ARGENTINA. SALTA: Alemania, alt. 1,300 meters, *Venturi* 9951. TUCUMÁN: Jerba Buena, alt. 650 meters, *Venturi* 58. Quebrada de Hualinchay, alt. 1,500 meters, *Venturi* 7775. Taffí del Balle, alt. 2,600 meters, *Venturi* 2893. Papia, alt. 750 meters, *Venturi* 1090.

Section DULCAMARA

Solanum amygdalifolium Steud. Nom. Bot. ed. 2. 600. 1841.

Solanum angustifolium Lam. Tabl. Encycl. **2**:18. 1793, non Mill. (1768.)

Type from Buenos Aires, Argentina, *Commerson*.

Solanum persicifolium Mart. Flora 21. Beibl. 78. 1838, non Dunal (1813).

Type from Sebastianopolis, Brazil, *Martius*.

Solanum handelianum Morong, Ann. N. Y. Acad. **7**: 175. 1892.

Solanum brittonianum Morong, *op. cit.* 174. Type from Río Pilcomayo, Paraguay, *Morong* 1531.

This rather common species has usually been known as *S. angustifolium* Lam., a homonym. It is habitally much like *S. malacoxylon* Sendtn. but may be recognized by its angled rather than terete branchlets. In Argentina it is known

by the vernacular names *duraznillo blanco* and *amor porteño*. The Chilean plant that has sometimes been confused with *S. angustifolium* is *S. tomatillo* Remy.

Some records are:

PARAGUAY: Asunción, *Morong* 818.

ARGENTINA: Buenos Aires, *Molfino; Debeaux* 70; *Miers* 1429. Villa Luján, Tucumán, *Venturi* 272. Upper Paraná River, Misiones, *Ekman* 816.

Solanum leptocaulon Van Heurck & Muell Arg. Obs. Bot. 40. 1870.

Type from Larecaja, Bolivia, alt. 3,600 meters, *Mandon* 404 (isotype NY).

A synonym is *S. pongoense* Rusby (Mem. N. Y. Bot. Gard. **7**: 348. 1927), the type of which came from Pongo de Quime, Bolivia, alt. 3,300 meters, *White* 165 (type NY).

Solanum lilacinum Rusby, Bull. Torrey Club **26**: 156. 1899.

Type from Unduavi, Bolivia, alt. 2,400 meters, *Rusby* 779 (NY).

A synonym is *S. buchtienii* Bitter (Repert. Sp. Nov. Fedde **10**: 558. 1912), whose type is from Unduavi, *Buchtien* 765 (isotype US).

Solanum miquelii Morton, nom. nov.

Solanum laetum Miq. Stirp. Surinam 135. 1850, non Kunze (1842).

Solanum sempervirens Dunal in DC. Prodr. **13**[1]: 88. 1852, non Miller (1768).

Type from British Guiana, *Schomburgk* 594.

Type from Surinam, *Focke & Kappler* 1599.

This is one of the commonest species in British Guiana. It is related to *Solanum pensile* Sendtn., of which a synonym may be *S. scandens* L. f. (1781), non Mill. (1768).

Solanum tinctum Morton, nom. nov.

Solanum penduliflorum Rusby, Descr. New S. Amer. Pl. 113. 1920, non Dammer (1912).

Type from Santa Marta, Colombia, *H. H. Smith* 2661 (NY).

A distinctive species related to *S. pensile* Sendtn., *S. miquelii* Morton, *S. ipomoea* Sendtn., and *S. ipomoeoides* Chod. & Hassl.

A second collection is from Río Guaviare, Colombia, alt. 240 meters, *Cuatrecasas* 7579.

Solanum endotrichum Bitter, Repert. Sp. Nov. Fedde **12**: 161. 1913.

Type from Miquinquirá near Bogotá, Cundinamarca, Colombia, *Idinael* 57.

Additional collections are:

COLOMBIA. CUNDINAMARCA: Bogotá, *Ariste-Joseph* A 418. SANTANDER: Vicinity of Vetas, alt. 3,100–3,250 meters, *Killip & Smith* 17267, 17313, 17327, 17388, 17910, 17916.

Section HERPYSTICUM

Solanum dalibardiforme Bitter, Repert. Sp. Nov. Fedde **11**: 484. 1913.

Type from Quindío, Colombia, *Goudot* 19.

This singular species is a small, wide-creeping herb with long-petioled, violet-like leaves. A second collection is:

COLOMBIA. Quindío Highway, between Cajamarca and summit of divide, Tolima, alt. 2,400 meters, *Killip & Varela* 34519.

Section INDUBITARIA

Solanum callianthum Morton, sp. nov.

Frutex vel arbor parva, ramulis novellis subtomentosis, pilis patentibus, pluries furcatis; folia solitaria, petiolata, petiolo plus minusve tomentoso; lamina foliorum ovata vel oblongo-ovata, breviter acuminata, supra pilis furcatis deciduis instructa, subtus praecipue in venis et venulis pilis patentibus pluries furcatis praedita,

demum glabrescens, venis primariis 6–8-jugis; inflorescentia oppositifolia, pedunculo communi non furcato, subtomentoso, multifloro, pedicellis pilosis; calyx externe floccoso-subtomentosus, pilis ramosis, lobis deltoideis; corolla alba, rotata, plicata, externe pilosa, pilis ramosis; ovarium apice vel ubique longe pilosum; stylus basi pilosus.

Shrub or small tree, 1.5–3.6 meters high, the branchlets subtomentose when young, the hairs patent, several times furcate; leaves solitary, petiolate, the petiole up to 1.1 cm. long, more or less tomentose; leaf blades ovate or oblong-ovate, up to 11 cm. long and 7.5 cm. wide, short-acuminate, cuneate or obtuse at base, subchartaceous, entire, green, bearing a few deciduous, furcate hairs above, pilose beneath (especially on the veins and venules), the hairs patent, several times furcate, often subbullate above, the veins somewhat impressed, the primary veins 6–8 pairs, elevated beneath; inflorescence opposite the leaves, simple, scorpoid, the common peduncle 5–11 mm. long, subtomentose, not furcate, the rhachis 6–12 mm. long, many-flowered, the pedicels 5–8 mm. long, pilose, thickened at apex; calyx about 4 mm. long, 7 mm. wide at apex, floccose-subtomentose externally, the hairs branched, the lobes deltoid, about 2 mm. long, 2 mm. wide at base, acute, more or less thickened at apex; corolla white, about 11 mm. long, rotate, plicate in the sinuses, the tube about 6 mm. long, the lobes deltoid, incurved at apex, pilose externally, the hairs branched; filaments very short, about 1 mm. long, flattened, connate to middle, glabrous; anthers free, oblong, about 5 mm. long, 2.2 mm. wide; ovary globose, pilose at apex or all over, the hairs long, branched; style slender, about 1 cm. long, pilose at base; berry globose, about 1.5 cm. in diameter, pubescent when young, finally glabrous and shining.

Type in the U. S. National Herbarium, No. 1,795,321, collected at Boquerón de Chipaqué, Cordillera Oriental, Department of Cundinamarca, Colombia, at 3,100–3,200 meters elevation, December 31, 1939, by J. Cuatrecasas (No. 7898).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA. CUNDINAMARCA: Macizo de Bogotá, alt. 3,000 meters, *Cuatrecasas* 5689, 5695. Sibaté, alt. 2,700–2,800 meters, *Pennell* 2429. Fusugasugá, alt. 2,650 meters, Sept. 1863, *Triana* 3855 (15). Camino de Guasca á Gachetá, *Ariste-Joseph* A 537, s. n. Simijaca, alt. 2,000 meters, *Pérez Arbeláez* 254. BOYACÁ: Valley of the Uvita, *Cuatrecasas* 1147. TOLIMA: Murillo, *Pennell* 3166. SANTANDER: Vicinity of Vetas, alt. 3,100–3,250 meters, *Killip & Smith* 17249. NORTE DE SANTANDER: Ocaña, *Schlim* 1117. EL CAUCA: Mount Santa Ana, *Pennell* 7449. Las Escaleretas, Moras Valley, *Pittier* 1370. WITHOUT SPECIAL LOCALITY: *Mutis* 1984, 2002, 3568.

The present species is evidently common in Colombia at higher altitudes. It seems odd that it has not been previously described. At one time I thought that it might be *Solanum venosum* H. & B., described from "Andibus Quinduensibus, alt. 1,300 hex." In the description, which is not very detailed, the most significant point is "branches floccose-pilose, the hairs thickish, pubescent . . ." This statement that the hairs themselves were "pubescent" appeared inexplicable to me until I came across a specimen collected by Killip and Hazen (No. 9168) somewhere near the type locality, at Magaña to Quindío Pass, Old Quindío Trail, Department of Caldas, Colombia. In this specimen the hairs of the stem are indeed peculiar, composed of a rather stout axis bearing innumerable short, spreading branches throughout its length. They resemble somewhat the stem hairs of *Solanum verbascifolium* L., but there is no other similarity to that species. I have little doubt that this specimen is *S. venosum*, especially as it agrees in all other respects with the description.

Solanum callianthum has a different type of hair, this being slender, spreading, and several to many times forked in the manner of deer antlers. In other respects, also, the two species are different, *S. venosum* having a compound, long-peduncu-

late inflorescence, larger leaves with more numerous veins, and a glabrous ovary and style. The inflorescence of *S. callianthum* is a simple, scorpoid, unilateral raceme.

Solanum mutisii Morton, sp. nov.

Frutex vel arbor parva, ramulis novellis dense ferrugineo-tomentulosis, pilis furcatis; folia solitaria, petiolata, petiolo tomentuloso; lamina foliorum elliptica vel oblonga, acuta vel obtusa, utrinque dense ferrugineo-tomentulosa, pilis furcatis, mox glabrescens, venis primariis 6–8-jugis; inflorescentia oppositifolia, pedunculo communi obsoleto vel brevi, non furcato, densifloro, pedicellis novellis ferrugineo-tomentulosis; calyx externe minute tomentulosus, profunde partitus, lobis deltoideis, rotundatis; corolla alba, plicata, lobis late ovatis, apice tomentulosis; ovarium glabrum vel puberulum.

Shrub or small tree, the branchlets terete, 3–4 mm. in diameter, densely ferruginous-tomentulose when young, the hairs furcate; leaves solitary, petiolate, the petiole 5–18 mm. long, tomentulose, finally glabrate; leaf blades elliptic or oblong, 5–15 cm. long, 3–7 cm. wide, acute or obtuse, obtuse or broadly cuneate at base, papyraceous, entire, green, densely ferruginous-tomentulose when young (the hairs furcate), lacking spreading hairs on the veins, not bearded in the vein axils beneath, finally glabrate or minutely floccose-tomentulose, the primary veins 6–8 pairs; inflorescence opposite the leaves, simple, scorpoid, the common peduncle very short or obsolete, not furcate, 0–5 mm. long, the rhachis very short, 1–3 mm. long, densely flowered, the pedicels up to 8 mm. long, densely ferruginous-tomentulose when young; calyx about 2.5 mm. long, 8 mm. wide, minutely tomentulose externally, deeply parted, the lobes deltoid, 2 mm. long and broad, rounded at apex; corolla white, about 1 cm. long, plicate in the sinuses, the tube 4 mm. long, the lobes broadly ovate, glabrate externally, a little tomentulose at apex; filaments thick, 1 mm. long, connate to middle, glabrous; anthers free, oblong, 4 mm. long, 1.5 mm. wide; ovary glabrous or puberulous; style glabrous; berry globose, 10–12 mm. in diameter, velutinous or glabrescent.

Type in the U. S. National Herbarium, No. 1,563,674, collected in Colombia by J. C. Mutis (No. 1993).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA. CUNDINAMARCA: Bogotá, *Ariste-Joseph* A252, s. n. Camino de Gachetá, January 1920, *Ariste-Joseph* A546. Monserrate, *Guevara Amórtegui* 255. Camino á la Calera, Munic. Usaqué, alt. 2,700–2,900 meters, Oct. 2, 1939, *García* 8058. Salto de Tequendama, May 1917, *Ariste-Joseph* A115. Boquerón near Bogotá, alt. 2,800 meters, January 1925, *A. Schultze* 111. Salto de Tequendama, alt. 2,500 meters, October 1938, *Cuatrecasas* 83, 93. SANTANDER: Western slope of Mount San Vicente, near Charta, alt. 2,500–2,700 meters, *Killip & Smith* 18994. Southern slope of Mount San Martín, near Charta, alt. 2,300–2,500 meters, *Killip & Smith* 19178. WITHOUT SPECIAL LOCALITY: *Mutis* 1980, 2000, 2003, 3565, 3581.

A very poor, sterile specimen from near Pasto, collected by Triana may also belong here.

The closest relationship of *S. mutisii* is with *S. callianthum* Morton, which may be distinguished as follows:

Hairs of young leaves, stems, pedicels and calyces short, densely matted, not at all spreading, the mature leaves glabrous or rarely floccose-tomentulose corolla glabrate except at apex of the lobes; ovary and style glabrous or merely puberulous ---------- **S. mutisii**

Hairs of all parts long, spreading, conspicuously furcate, the leaves at maturity always bearing some persistent spreading hairs on the veins; corollas densely pilose; ovary and style long-pilose ---------- **S. callianthum**

Section LEIODENDRON

This section is proving to be surprisingly rich in species in Colombia. I am describing here a few of the more outstanding new discoveries, but there remain a good many species still undescribed. The older species have been much confused in herbaria. I have not the materials to straighten out the taxonomy of the whole group, but I have prepared a partial key, which will distinguish the new species here described from those previously known from Colombia:

Leaves triplinerved---------- **1. S. triplinervium**
Leaves pinnately nerved.
Leaf margin strongly undulate-crispate; inflorescence arising from the internode---------- **2. S. crispulum**
Leaf margin plane; inflorescence opposite the leaves (except in *S. gracilescens*).
Leaves with tufts of long, simple hairs in the axils of the veins beneath, these sometimes extending to the veins or adjacent leaf tissue.
S. psychotrioides H.B.K., **S. laevigatum** H.B.K., **S. anonifolium** H.B.K., **S. micranthum** Willd., **S. triste** Jacq., **S. leucocarpum** Rich., **S. calycopogon** Bitter, and **S. deflexiflorum** Bitter.
Leaves without long hairs in the vein axils beneath or on the veins or lower surface.
Calyx lobes strongly unequal in fruit, some over twice as long as others.
Flowers small (corolla lobes 3 mm. long, anthers 1.6 mm. long); inflorescence pendulous, with elongate peduncle, rhachis, and pedicels---------- **3. S. irregulare**
Calyx lobes equal.
Anthers persistently connate at apex; corolla lilac, the lobes long-pilose.
Inflorescence pendulous, with elongate peduncle, rhachis, and pedicels---------- **4. S. oxyphyllum**
Anthers free throughout; corolla white, glabrous or short-glandular-pilosulous at apex or on the margins.
Leaf blades 7–8 times as long as broad---------- **5. S. aquatile**
Leaf blades broader.
Inflorescence furcate; leaves bearing minute, simple, eglandular hairs on the surfaces, very large (22–32 cm. long, 11.2–18 cm. broad), solitary---------- **6. S. grandifolium**
Inflorescence simple; leaves not hairy on the surface, at least at maturity, sometimes glandular, smaller, solitary or geminate.
Corolla large (about 11 mm. long and over 2 cm. broad), conspicuously plicate in the sinuses, the lobes over 5 mm. broad; inflorescences extra-axillary, not opposite the leaves. Calyx lobes conspicuously mucronate---------- **7. S. gracilescens**
Corolla smaller, not plicate in the sinuses, the lobes narrower; inflorescences opposite the leaves.
Branchlets obviously puberulous with incurved hairs; calyx 0.5 mm. long. Inflorescence bearing only one flower in anthesis at a time; leaves solitary, the blades not over 7.7 cm. long---------- **8. S. dissimile**
Branchlets glabrous or merely glandular; calyx 1.2 mm. long or more.
Primary leaf veins 16–20 pairs. Leaves solitary.
9. S. marantifolium

Primary leaf veins not over 10 pairs.
Leaves solitary. Peduncle elongate (10–14 mm.), the rhachis elongate (15–20 mm.), the pedicels very short (2 mm.)---------- **10. S. longevirgatum**
Leaves geminate, very unequal, the smaller of a pair less than half as long as the larger.
Ovary villous; style villous below-- **11. S. cornifolium**
Ovary and style glabrous.
Inflorescence pedunculate (5–10 mm.). Rhachis glandular; calyx 1.2–1.8 mm. long- **12. S. orgyale**
Inflorescence sessile.
Pedicels at anthesis 15–18 mm. long; calyx 2.5–3 mm. long; corolla 6.8–7.3 mm. long; anthers 4 mm. long---------- **13. S. gratum**
Pedicels at anthesis 4–7 mm. long; calyx 1.5 mm. long; corolla 3.5 mm. long; anthers 2 mm. long---------- **14. S. arboreum**

1. Solanum triplinervium Morton, sp. nov.

Frutex, ramulis glaberrimis, flexuosis; folia solitaria, petiolata, petiolo glabro; lamina foliorum oblanceolata, longe acuminata, basi cuneata, utrinque glaberrima, haud nigricans, triplinervis, venis secundariis numerosissimis, parallelis, marginem versus anastomosantibus; inflorescentia oppositifolia, pedunculo communi brevissimo, glabro, non furcato, multifloro, pedicellis secundis, glabris, gracilibus; calyx cyathiformis, basi cuneatus, truncatus, subinteger; corolla alba, lobis acutis; filamenta brevia, basi connata; antherae oblongae; ovarium glabrum.

Slender shrub about 2 meters high, the branchlets terete, about 3 mm. in diameter, glabrous, conspicuously flexuous, the internodes 2–3.5 cm. long; leaves solitary, petiolate the petiole about 1 cm. long, terete, glabrous; leaf blades oblanceolate, up to 25 cm. long and 8 cm. wide, long-acuminate, cuneate at base, a little oblique, glabrous and eglandular on both sides, not bearded in the vein axils beneath, entire, submembranaceous, pale green above, yellowish-green beneath, not darkening in drying, triplinerved, the nerves coming off at an acute angle, the abaxial nerve arising from the midrib 1.5–3 cm. above base, the adaxial 3–5.5 cm. above base, the secondary veins very numerous, parallel, coming out at about a right angle, anastomosing in a flexuous, submarginal veinlet; inflorescence opposite the leaves, scorpoid, the common peduncle very short, 2–3 mm. long, glabrous, not furcate, the rhachis glabrous, up to 10 mm. long, recurved, 24–36-flowered, the pedicels secund in two lines, the flowering 7–10 mm. long, slender, about 0.25 mm. thick, glabrous, the fruiting suberect, straight, about 16 mm. long, thicker, about 0.75 mm. in diameter at middle, thickened apically; calyx cyathiform, about 1.5 mm. long, 3.5 mm. wide at apex, the base cuneate, truncate, subentire; corolla white, 12 mm. in diameter, 5.5 mm. long, the tube about 3 mm. long, often ruptured in the sinuses, the lobes acute; filaments about 1 mm. long, glabrous, short-connate at base; anthers greenish-yellow, oblong, a little unequal, four about 2.5 mm. long, the fifth 3 mm. long; ovary globose, glabrous; style lightly curved, glabrous, about 4 mm. long; berry unknown.

Type in the U. S. National Herbarium, No. 1,770,148, collected on the east side of Gorgona Island, Department of Nariño, Colombia, in dense forest along stream, at 50–100 meters elevation, February 11, 1939, by E. P. Killip and H. García (No. 33169).

The triplinerved leaves of this species, strongly suggesting Melastomaceae, are anomalous in the Solanaceae. The present plant, which agrees in other respects with *Solanum*, section *Leiodendron* (in which the venation is regularly pinnate), I regard as constituting a new subsection:

Solanum, sect. *Leiodendron*, subsect. **Triplinervia.** Folia triplinervia, venulis secundariis numerosis, parallelis, ex angulo recto egredientibus, in venulam submarginalem anastomosantibus.

2. Solanum crispulum Morton, sp. nov.

Suffrutex, non ramosus, caulibus sursum pilosulis, glabrescentibus; folia solitaria, breviter petiolata; lamina foliorum oblonga vel ovato-oblonga, usque ad 17 cm. longa et 7 cm. lata, longe acuminata, basi late cuneata vel subrotundata, margine perspicue crispata, supra glaberrima, subtus juventute in nervo medio et venulis parce pilosula, venis primariis 6–8-jugis; inflorescentia extra-axillaris, non oppositifolia, pedunculo communi pilosulo, floribus confertis, pedicellis crassis, pilosulis; calyx basi angustatus, externe parce pilosus, lobis elongato-deltoideis, non mucronatis; corolla alba, lobis lanceolatis; antherae oblongae.

Subshrub up to 60 cm. high, not branched, the stems green, terete, about 5 mm. in diameter near base, pilosulous at apex (the hairs simple, eglandular), glabrous below; leaves solitary, short-petiolate, the petiole 8–10 mm. long, more or less pilosulous; leaf blades oblong or ovate-oblong, up to 17 cm. long and 7 cm. wide, long-acuminate, broadly cuneate or rounded at base, subcomplicate, pale green on both sides, not darkening in drying, papyraceous, conspicuously crispate at the margins, glabrous above, when young sparsely pilosulous beneath on the midrib and veins (the hairs minute, spreading, eglandular, persistent on the midrib), not bearded in the vein axils, the primary veins 6–8 pairs, coming off at an acute angle, arcuate, anastomosing toward the margin, elevated on both surfaces; inflorescence extra-axillary, not opposite the leaves, the common peduncle about 10 mm. long, pilosulous, the rhachis very short, about 10-flowered, the flowers crowded, the flowering pedicels about 8 mm. long, thick (about 1 mm. in diameter), pilosulous; calyx about 4 mm. long and 6 mm. broad at apex, narrowed at base, very sparsely pilose externally, the lobes elongate-deltoid, about 2 mm. long and 1.6 mm. wide at base, acute, not mucronate; corolla white, 7–8 mm. long, the tube 2 mm. long, the lobes lanceolate, 2–2.5 mm. broad, glandular externally at apex; filaments 1.5 mm. long, connate to middle or higher, glabrous; anthers oblong, 3 mm. long and 1.6 mm. wide; ovary globose, glabrous; style about 4 mm. long, thick, glabrous.

Type in the Herbario Nacional Colombiano, collected along the Río Tambito, Cerro de Munchique, Cordillera Occidental, Department of El Cauca, Colombia, at 2,000–2,500 meters elevation, July 16, 1939, by E. Pérez Arbeláez and J. Cuatrecasas (No. 6252); fragments in the U. S. National Herbarium.

The relationship of *S. crispulum* is uncertain, but it may perhaps be placed in *Leiodendron* even though the inflorescence is extra-axillary (as in *Morella*) rather than opposite the leaves. The leaf margin is so strongly undulate-crispate as to make it appear erose or serrate. The only species of *Solanum* that are said to show this character are two Brazilian species known to me from description only. According to description *Solanum serratum* Dunal, from the Organ Mountains, Rio de Janeiro, differs in being a larger, divaricately branched shrub, with a 1-flowered inflorescence opposite the leaves, which are described as "long-serrate." This species has perhaps been erroneously placed in section *Leiodendron*. The single fertile flower, with large fruit ("oviform, 1 inch long") is suggestive of the subgenus *Leptostemonum*. Since the flowers are not known, this plant is conceivably not a member of the genus *Solanum* at all.

The other Brazilian species with undulate-crisped leaves is *S. undulatum* Dunal, described from an unstated locality. This may be distinguished as follows (from description):

Leaves geminate, strongly unequal, the smaller ovate-orbicular, one fourth the size of the larger; larger leaf blades small, 6.2 cm. long and 1–1.2 cm. wide; calyx small, 2 mm. wide, the lobes mucronate; corolla 3 times as long as the calyx. **S. undulatum**

Leaves solitary, all subequal; leaf blades much larger, 9–17 cm. long, 3–7 cm. wide; calyx 6 mm. wide, the lobes not mucronate; corolla about 2 times as long as calyx---------- **S. crispulum**

3. Solanum irregulare Morton, sp. nov.

Frutex, ramulis praecipue in nodis parce pilosis; folia geminata, majora breviter petiolata; lamina foliorum majorum ovata, acuminata, basi leviter decurrens, siccitate nigricans, glabrata, minute et inconspicue glandulosa, venis primariis 7–9-jugis; folia minora conformia sed subsessilia; inflorescentia nigricans, pendula, oppositifolia, pedunculo communi elongato, glabro, non furcato, multifloro, pedicellis gracilibus, secundis, glabris; calyx floriferus subturbinatus, pilis longis albis dissitis, lobis lineari-deltoideis, acuminatis, fructiferus accrescens, valde irregularis, lobis inaequalibus; corolla alba, rotata, tubo brevissimo, lobis oblongis, acutis; filamenta brevissima, ad medium connata, glabra.

Ill-smelling shrub 1–2 meters high, the branchlets blackish, terete, sparsely pilose, especially at the nodes; leaves all geminate, the larger short-petiolate, the petiole 6–8 mm. long, glabrate; leaf blades ovate, 16–18 cm. long and 7–9 cm. wide, acuminate, cuneate and a little decurrent at base, membranaceous, entire, dark when dry, glabrate, minutely and inconspicuously glandular, the primary veins 7–9 pairs, a little elevated beneath, the secondary veins inconspicuous; smaller leaves up to 7.5 cm. long and 5 cm. wide, subsessile, conform; inflorescence blackish, pendulous, opposite the leaves, the common peduncle 1.5–2 cm. long, slender, glabrous, not furcate, the rhachis 2.5–3 cm. long, curved, glabrous, many-flowered, the pedicels about 1 cm. long, slender, secund, glabrous; calyx in flower subturbinate, about 2 mm. long and 3.5 mm. broad, externally bearing scattered, long, white hairs, the lobes linear-deltoid, about 1 mm. long, acuminate, entire, subequal; fruiting calyx accrescent, very irregular, the lobes unequal, two of them about 2 mm. long, one about 3.5 mm. long, and two about 5 mm. long; corolla white, rotate, stellate, about 9 mm. broad, the tube very short, about 1 mm. long, the lobes oblong, about 3 mm. long and 1.5 mm. broad, acute, glandular-papillose externally, not pilose; filaments very short, about 0.25 mm. long, connate to middle, glabrous; anthers oblong, about 1.6 mm. long, 1 mm. wide; ovary glabrous; style straight, glabrous.

Type in the U. S. National Herbarium, No. 1,707,166, collected at Puerto Sanchez, on Río Humea, Intendencia of El Meta, Colombia, in thickets along river, at 400 meters elevation, February 8, 1939, by Oscar Haught (No. 2587).

In calyx structure this species is unlike other members of the section *Leiodendron*. In anthesis the calyx is nearly regular, but after fertilization the lobes increase greatly but irregularly in size. Two lobes remain small (about 2 mm. long), two others become over 5 mm. long, and the fifth is intermediate in size. Other characters to be noted in distinguishing the present species are the dark color taken by the leaves, stems, and inflorescences in drying, the elongate, pendulous inflorescences, the geminate leaves (with the smaller of a pair conform, but about half the size of the larger), these glabrous and not bearded in the vein axils beneath but sparingly glandular, and the small flowers.

4. Solanum oxyphyllum Morton, sp. nov.

Arbor parva, ramulis glabris; folia solitaria vel geminata, petiolata, petiolo subtus glabro, supra canaliculato et perspicue puberulo et glandulifero; lamina foliorum oblonga, longe acuminata, basi rotundata vel subcordata, supra in nervo

medio et venis puberula, subtus glaberrima; inflorescentia oppositifolia, pendula, pedunculo communi elongato, glabro, multifloro, pedicellis glabris; calyx subcyathiformis, lobis mucronatis, denticulatis, parce glandulosis; corolla lilacina, tubo brevissimo, lobis lineari-lanceolatis, reflexis, externe capitato-glandulosis, longe pilosis; antherae angustae, apice connatae.

Small tree about 3 meters high, the branchlets slender, about 1.5 mm. in diameter, terete, smooth, glabrous; leaves solitary or geminate, petiolate, the petiole up to 2 cm. long, glabrous beneath, channeled above and conspicuously puberulous and glandular; larger leaf blades oblong, up to 11.5 cm. long and 5.5 cm. broad, sharply long-acuminate, rounded or subcordate at base, green, not darkening in drying, entire, membranaceous, puberulous above on the midrib and veins (the hairs minute, incurved), entirely glabrous beneath, not bearded in the vein axils; smaller leaves conform, shorter petiolate (up to 1 cm.), the blade up to 6.2 cm. long, cordate at base; inflorescence opposite the leaves, pendulous, the common peduncle up to 2 cm. long, glabrous, slender, the rhachis very slender, 6–10 cm. long, glabrous, many-flowered, the pedicels slender, about 13 mm. long, glabrous; calyx subcyathiform, about 2.5 mm. long and 5 mm. broad at apex, the lobes ovate, about 1.5 mm. long, mucronate, denticulate, glabrate, sparsely glandular; corolla lilac, about 12 mm. long, the tube very short (about 1.5 mm.), the lobes linear-lanceolate, reflexed, acuminate, capitate-glandular externally, long-pilose, especially on the margins; filaments about 1.5 mm. long, glabrous, connate to the middle; anthers narrow, about 4 mm. long and 0.75 mm. wide, connate at apex; ovary glabrous, globose; style slender, about 5 mm. long, glabrous.

Type in the U. S. National Herbarium, No. 1,518,016, collected at Umbría, Comisaría del Putumayo, Colombia, 0°54′ N., 76°10′ W., at 325 meters elevation, November 13, 1930, by G. Klug (No. 1776).

Solanum oxyphyllum has a number of features that are unusual in the section *Leiodendron*, notably in having the anthers persistently connate at apex, even in flowers in full anthesis. The calyx lobes are mucronate, as in many other species, but they are also minutely denticulate, a feature that I have not noted in any other species. Most species of *Leiodendron* have white flowers, rather than lilac as in this. The corolla lobes are unusually long and narrow, and are strongly pilose and glandular. The general aspect is also rather distinctive, owing to the subcordate-based, long-acuminate leaves and the very elongate, slender, pendulous inflorescences.

5. Solanum aquatile Morton, sp. nov.

Frutex virgatus, ramulis glabris, eglandulosis; folia solitaria vel subgeminata, subaequalia, breviter petiolata; lamina foliorum lineari-lanceolata, angusta, apice et basi attenuata, utrinque glaberrima, eglandulosa, venis primariis 9–11-jugis; inflorescentia oppositifolia, pedunculata, pedunculo glabro, furcato, multifloro; pedicelli graciles, glabri; calyx glaber, lobis deltoideis, acutis; corolla alba, lobis oblongis, glabris; filamenta ad medium connata, glabra; ovarium glabrum.

Slender shrub 1–2 meters high, sparsely branched, virgate, the stems subangulate, the branchlets short, straight, ascending at an acute angle, glabrous, eglandular; cauline leaves solitary, those of the branchlets subgeminate, subequal, subsessile or short-petiolate; leaf blades linear-lanceolate, up to 19 cm. long and 2.5 cm. wide, long-attenuate at apex, long-attenuate at base, decurrent into the petiole, entire, pale green on both sides, not darkening in drying, submembranaceous, glabrous and eglandular on both sides, not bearded in the vein axils, the primary veins 9–11 pairs, leaving at an acute angle, arcuate, anastomosing toward the margin; inflorescence opposite the leaves, 2–4 cm. long, the common peduncle

elongate, 5–18 mm. long, glabrous, furcate at apex, the rhachis short, many-flowered, the flowers crowded; pedicels about 8 mm. long in flower, slender, glabrous; calyx about 2.5 mm. long, 4 mm. broad, glabrous, the lobes deltoid, 1 mm. long, 1 mm. wide at base, acute, not mucronate; corolla white, about 11 mm. in diameter, about 7 mm. long, the tube short, 1.7–2 mm. long, the lobes spreading, oblong, about 5 mm. long, 1.5–2 mm. wide, acute, glabrous except for the minutely glandular-verrucose margins; filaments glabrous, about 1.5 mm. long, connate to the middle; anthers narrowly oblong, about 2.5 mm. long and 0.7 mm. wide; ovary globose, glabrous; style slender, about 4 mm. long, glabrous.

Type in the U. S. National Herbarium, No. 1,662,564, collected at Camp Aguila, Carare Valley, in the vicinity of Puerto Berrio, Department of Santander, Colombia, at 100–700 meters elevation, August 9, 1935, by Oscar Haught (No. 1868).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Near La Jagua, 40 km. northeast of Chiriguaná, Magdalena, August 20, 1938, *Haught* 2266. Bahía Solano, near Ciudad Mutis, El Chocó, at sea level, February 21–23, 1939, *Killip & García* 33608.

The type bears Mr. Haught's notation that the plant is "a slender shrub of watercourses, submerged in wet weather." *Haught* 2266 bears the comment "in bed of swift-flowing creek." The Killip and García specimen was collected from a plant growing in an open stream bed. This habit of growing in the beds of intermittent streams is very unusual , if not unique, in the genus *Solanum*.

Solanum aquatile may be distinguished from other Colombian species of the section *Leiodendron* by its elongate, very narrow, willowlike leaves, these entirely glabrous and eglandular, its glabrous stems and inflorescences, and its furcate peduncles. Its virgate aspect must be rather distinctive, the stem being erect, straight, and sparingly branched, the branches short and nearly erect.

The Killip and García specimen is in fruit. The berries are globose, fleshy, about 12 mm. long, glabrous, and apparently black.

6. Solanum grandifolium Morton, sp. nov.

Frutex, ramulis glabris; folia solitaria, longe petiolata, petiolo glabro; lamina foliorum maxima, ovalis, obtusa, basi late cuneata, pallide viridis, nitens, in venis primariis et mesophyllo parcissime pilosula, venis primariis ca. 12-jugis, venulis secundariis reticulatis; inflorescentia oppositifolia, pedunculo communi elongato, glabro, apice furcato, multifloro, rhachibus et pedicellis minutissime glanduloso-puberulis; calyx cyathiformis, externe parce glandulosus, subtruncatus vel leviter lobatus, lobis minutis, haud mucronatis, ciliolatis; corolla alba, tubo brevissimo, lobis oblongis.

Shrub, the branchlets thick, about 6 mm. in diameter, terete, glabrous; leaves solitary, long-petiolate, the petiole 3–4 cm. long, glabrous; leaf blades oval, 22–32 cm. long, 11.2–18 cm. wide, obtuse and slightly contracted at apex, broadly cuneate at base, a little oblique, scarcely decurrent, pale green, not darkening in drying, shining, entire, papyraceous, the midrib nearly glabrous, the primary veins and mesophyll very sparsely pilosulous (the hairs scattered, minute, straight, simple, eglandular), not bearded in the vein axils beneath, the primary veins about 12 pairs, elevated beneath, the secondary veins reticulate; inflorescence opposite the leaves, the common peduncle up to 2 cm. long, glabrous, furcate at apex, the rhachis up to 1.7 cm. long, many-flowered, minutely glandular-puberulous, the flowering pedicels short, 4–6 mm. long, slender, minutely glandular-puberulous; calyx cyathiform, about 1.5 mm. long and 3 mm. broad at apex, sparsely glandular externally, subtruncate or slightly lobed, the lobes scarcely evident or rarely up to 0.5 mm. long, about 1 mm. wide, rounded, not mucronate, ciliolate; corolla white, about 7 mm. long, the tube very short, about 1.5 mm. long, the lobes oblong, 2.5 mm. wide, scarcely acute, glandular-papillose externally at apex and on

margins; filaments about 1 mm. long, connate to middle, glabrous; anthers oblong, 3 mm. long and 1 mm. wide; ovary glabrous, globose; style straight, glabrous.

Type in the U. S. National Herbarium, No. 1,795,303, collected at San José del Guaviare, Comisaría del Vaupés, Colombia, at 240 meters elevation, November 4, 1939, by J. Cuatrecasas (No. 7394).

The present species may be distinguished from other Colombian species of section *Leiodendron* by its very large, shining leaves, bearing scattered, very minute, simple hairs all over the mesophyll of the lower leaf surface, but not bearded in the vein axils. It may also be distinguished from most of the other species by the pedunculate, furcate inflorescence.

7. **Solanum gracilescens** Morton, sp. nov.

Frutex, ramulis glandulosis, apice parce pilosulis; folia geminata, petiolata, petiolo crasso, juventute parce pilsosulo; lamina foliorum acuminata, basis cuneata, haud nigricans, utrinque in mesophyllo parce glandulosa, in costa et venis parce glanduloso-pilosula, subtus in axillis venarum haud barbata, venis primariis 8–11-jugis; inflorescentia extra-axillaris, non oppositifolia, pedunculo communi nullo, rhachi simplici, multiflora, pedicellis gracilibus, parce glandulosis; calyx cupuliformis, glaber, leviter lobatus, lobis perspicue sub apice mucronatis; corolla alba, rotata, plicata; filamenta glabra, usque ad medium connata; antherae oblongae; ovarium glabrum.

Sparsely branched shrub, the branchlets about 4 mm. in diameter, glandular, sparsely pilosulous when young; leaves geminate, equal or unequal, petiolate, the petiole up to 2.5 cm. long, about 2 mm. thick, glandular and sparsely pilosulous when young; larger leaf blades up to 16 cm. long and 7.2 cm. wide, acuminate, cuneate at base, a little decurrent, papyraceous, entire, green, not darkening in drying, sparsely glandular on both sides on the mesophyll, sparsely glandular-pilosulous on the midrib and veins, not bearded in the vein axils beneath, the primary veins 8–11 pairs; smaller leaves conform; minute, axillary, stipule-like leaves developed; inflorescence extra-axillary, not opposite the leaves, a common peduncle not developed, the rhachis simple, curved, 5–6 mm. long, many-flowered, the flowering pedicels about 12 mm. long, slender, sparsely glandular when young, the fruiting thicker, 15–18 mm. long; calyx cuplike, 2.5–3 mm. long, 4–4.5 mm. wide, glabrous, lightly lobed, the lobes about 1 mm. long and 2 mm. broad at base, rounded, conspicuously mucronate below the apex; corolla white, rotate, about 2.2 cm. in diameter, about 13 mm. long, plicate in the sinuses, the lobes broadly ovate, acute, subhyaline at margin, glabrous, except for the minutely verrucose margins; filaments about 1.5 mm. long, glabrous, connate to middle; anthers oblong, about 4 mm. long and 1.5 mm. wide; ovary glabrous; style glabrous, about 5 mm. long; berry globose, about 10 mm. diameter, glabrous.

Type in the U. S. National Herbarium, No. 1,795,248, collected at Carpinterías, between the peaks of Munchique and Altamira, Cordillera Occidental, Department of El Cauca, Colombia, at 2,450–2,500 meters elevation, July 15, 1939, by E. Pérez Arbeláez and J. Cuatrecasas (No. 6170).

8. **Solanum dissimile** Morton, sp. nov.

Frutex ramosus, ramulis crassis, novellis incurvo-puberulis; folia solitaria, breviter petiolata, petiolo parce puberulo; lamina foliorum acuminata, viridis, glaberrima, venis primariis 5–8-jugis; inflorescentia oppositifolia, pedunculo communi brevi, puberulo, non furcato, pedicellis gracilibus, glabris; calyx minutus, leviter lobatus, lobis non mucronatis, externe apice parce puberulis; corolla alba, parva, tubo brevissimo, lobis reflexis, oblongo-linearibus; filamenta ad medium connata, glabra; antherae oblongae; ovarium glabrum.

Slender shrub about 2.4 meters high, the branchlets about 2.5 mm. in diameter, terete, conspicuously incurved-puberulous when young, glabrescent; leaves solitary, short-petiolate, the petiole up to 5 mm. long, sparsely puberulous; leaf blades 5–7.7 cm. long and 1.8–2.8 cm. broad, acuminate, broadly cuneate or obtuse at base, membranaceous, entire, green, not darkening in drying, entirely glabrous, not bearded in the vein axils, the primary veins 5–8 pairs; inflorescence opposite the leaves, the common peduncle short, about 2 mm. long, puberulous, not furcate, the rhachis about 2 mm. long, up to 6-flowered, the flowering pedicels slender, about 10 mm. long, glabrous, thickened at apex, the fruiting thicker, about 20 mm. long; calyx minute, about 0.5 mm. long, lightly lobed, the lobes about 0.25 mm. long, rounded, not mucronate, puberulous externally at the apex; corolla white, about 6 mm. long, the tube very short, about 1 mm. long, the lobes reflexed, oblong-linear, about 5 mm. long and 2 mm. wide, glabrous except for the papillose margins; filaments about 1 mm. long, connate to the middle, glabrous; anthers oblong, about 3.5 mm. long and 1.5 mm. wide; ovary glabrous; style slender, about 5.5 mm. long, glabrous; berry globose, about 13 mm. in diameter, glabrous.

Type in the U. S. National Herbarium, No. 1,355,466, collected near Loso, north of Toledo, Department of Norte de Santander, Colombia, in woods along stream, at 2,200–2,400 meters elevation, March 6–7, 1927, by E. P. Killip and A. C. Smith (No. 20415).

Solanum dissimile may be distinguished from other Colombia species of the section *Leiodendron* by its puberulous, eglandular branchlets, its small, solitary leaves, and its reduced inflorescences, with a short peduncle and rhachis, bearing only one flower in anthesis at a time. The calyx is smaller than in any other species of *Leiodendron*.

9. **Solanum marantifolium** Bitter, Repert. Sp. Nov. Fedde **11**: 13. 1912.

Type from Popayán, El Cauca, Colombia, *Lehmann* 8513 (photograph US). Colombia: Bahía Solano, El Chocó, *Killip & García* 33541.

10. **Solanum longevirgatum** Bitter, Repert. Sp. Nov. Fedde **18**: 67. 1922.

Type from Popayán, El Cauca, Colombia, alt. 2,000–2,500 meters, *Lehmann* 8511 (photograph US).

11. **Solanum cornifolium** H. & B. ex Dunal, Sol. Syn. 21. 1816.

Type from between Palacé and Popayán, El Cauca, Colombia, *Humboldt*.

12. **Solanum orgyale** Morton, sp. nov.

Frutex, ramulis novellis glanduloso-leprosis, mox glabratis; folia omnia geminata, valde inaequalia, majora longe petiolata, petiolo glabro; lamina foliorum majorum rhombea vel elliptica vel elliptico-oblonga, acriter acuminata, basi longe cuneata, glaberrima, eglandulosa, venis primariis 7–10-jugis; folia minora breviter petiolata, elliptica vel ovata, breviter acuminata vel obtusa vel emarginata; inflorescentia oppositifolia, simplex, pedunculo communi glanduloso, multifloro, pedicellis confertis, inconspicue glanduloso-pilosulis; calyx cupuliformis, glabratus, leviter lobatus, lobis vix mucronatis; corolla alba, parva, lobis oblongis.

Erect shrub 2 meters high, the young branchlets glandular-leprose, soon glabrous, terete, about 3 mm. in diameter; leaves all geminate, very unequal, the larger long-petiolate, the petiole up to 3 cm. long, glabrous; larger leaf blades rhombic or elliptic or elliptic-oblong, up to 26.5 cm. long and 12 cm. wide, abruptly and sharply acuminate, long-cuneate at base and a little decurrent into petiole, papyraceous, entire, green, not darkening in drying, glabrous on both sides, not bearded in the vein axils beneath, eglandular, the primary veins 7–10 pairs, coming off at an acute angle; smaller leaves short-petiolate (the petiole up to 8 mm. long), elliptic or ovate, 4.5–9.5 cm. long and 2.2–5.3 cm. wide, short-

acuminate or obtuse or emarginate, cuneate at base; inflorescence opposite the leaves, the common peduncle 5–10 mm. long, not furcate, glandular, the rhachis 0.5–3.5 cm. long, curved, densely glandular, many-flowered, the pedicels crowded, secund in two lines, glandular-pilosulous, about 4 mm. long, 0.3–0.5 mm. in diameter, the fruiting thicker; calyx cup-shaped, 1.2–1.8 mm. long, 2.5–4 mm. wide at apex, glabrate, lightly lobed, the lobes scarcely 0.5 mm. long, scarcely mucronate, the fruiting calyx accrescent, about 4 mm. long; corolla white, 3–6 mm. long, the tube short, 0.8–1.5 mm. long, the lobes oblong, acutish, minutely glandular-papillose externally; filaments 0.5–0.8 mm. long, connate at base, glabrous; anthers oblong, 2.2–3 mm. long, 0.8–1.2 mm. wide; ovary glabrous; style short; berry red (teste Haught), 5 mm. in diameter.

Type in the U. S. National Herbarium, No. 1,707,360, collected at San Fernando, between Río Carare and Puerto Berrio, Department of Santander, at 300 meters elevation, June 30, 1939, by Oscar Haught (No. 2850).

Solanum orgyale belongs to the section *Leiodendron*. It has no outstanding characters but does not agree with any other species known from the Andean region. Points that will aid in distinguishing it are the geminate, unequal, glabrous, and eglandular leaves, the glandular inflorescence and young stems, the short pedicels, and the small flowers.

13. Solanum gratum Bitter, Repert. Sp. Nov. Fedde **18**: 59. 1922.
Type from Colonia Tovar, Venezuela, *Moritz* 1701.
It is not certain that this species occurs in Colombia.

14. Solanum arboreum H. & B. ex Dunal, Sol. Syn. 20. 1816.
Type from Cumanacoa, Venezuela, *Humboldt* (photograph US).
Reported from Colombia, but it is not certain that it occurs there.

Section LYCIANTHES

In 1917 Dr. E. Hassler segregated *Lycianthes* as a distinct genus, recognizing three species, *L. lycioides*, *L. candicans*, and *L. dombeyi*, all actually forms of a single collective species that is very common at high elevations in the Andes. The segregation was based on the peculiar structure of the fruit, which is not a fleshy, many-seeded berry, as in other species of *Solanum*, but is 8-seeded, each seed being enclosed within distinct sclerotic partition walls. In other respects, however, *Lycianthes*, as delimited by Hassler, is similar to species that he retained in *Solanum*. This single character does not seem to me sufficient to justify the segregation of *Lycianthes* as a distinct genus.

In 1919 Dr. Georg Bitter greatly enlarged the generic concept of *Lycianthes*, recognizing 134 species. As delimited by Bitter the genus consists of those species of *Solanum* that have *both* the inflorescence axillary and the calyx truncate. However, neither of these characters is peculiar to *Lycianthes*, axillary inflorescences being characteristic of *Solanum*, section *Polybotryon* in a strict sense (section *Bassovia* of Bitter), and truncate calyces being found in several species belonging to unrelated sections of *Solanum*.

The segregation of *Lycianthes* has been defended on the grounds that, inasmuch as *Solanum* is so large, the separation of a good-sized, recognizable group is a decided convenience. I admit that *Solanum* is inconveniently large. However, if it is thought desirable on the grounds of convenience to reduce the size of the genus, a very much better case can be made out for segregating as distinct genera the two traditional subgenera *Pachystemonum* and *Leptostemonum*. This would approximately cleave the genus in half. Moreover, these two subgenera are separated by more fundamental characters than those possessed by *Lycianthes*. *Leptostemonum* has spiny leaves and stems, and attenuate anthers with a minute terminal pore; *Pachystemonum* has unarmed leaves and stems, and oblong anthers

dehiscent by a large, introrse pore. Of the hundreds of species of *Solanum*, I know of only a few that do not show this correlation of characters. Yet such a segregation is unthinkable and, so far as I know, has never been suggested.

The argument for the recognition of *Lycianthes* is not acceptable, not only because the characters are not distinctive, but chiefly, so long as natural relationships are held as a guide, because *Lycianthes* is so obviously more closely related to *Pachystemonum* than *Pachystemonum* itself is to *Leptostemonum*. So long as these two more distantly related groups are retained in the same genus, one can not segregate a weakly characterized offshoot from one of them.

Bitter's treatment of the *Lycianthes* group is good, although difficult to use, the differences between the species not being clearly indicated. There is no key. The sectional arrangement is excellent, but the division into series is based on a character that Bitter believed fundamental but about which I am skeptical. In the berries of certain species of *Lycianthes* (also of other sections of *Solanum*) there occur minute "stone granules," possibly roughly similar in origin to the stone cells in the fruits of *Pyrus*. Bitter claimed that the presence or absence of these "stone granules," their number, position, and size were constant in a given species of *Solanum*. Whether this is so will have to be determined by extensive field work. I am inclined to doubt the taxonomic significance of this character, since by using it Bitter was able to segregate so many otherwise similar species from the common *Solanum nigrum*. In any case it is difficult of practical application in the study of herbarium material.

Inasmuch as the species of this section have never been keyed, and especially since Bitter's monograph was published in a serial available only in the largest libraries, it seems worth while to present the following brief treatment of the South American species. The keys will undoubtedly require modification, a large percentage of the species still being known from a single collection only. In addition, there are a good many undescribed species present in recent collections, especially in those from Colombia. The reduction of *Lycianthes* obviously necessitates a good many new names and combinations. I have avoided making any transfers of doubtfully valid species. For convenience the species are treated regionally.

THE SPECIES OF SOLANUM, SECTION LYCIANTHES, IN COLOMBIA, VENEZUELA, AND ECUADOR

KEY TO SPECIES

Berry 8-celled, each cell wall sclerotic, enclosing a single seed; leaves small 0.6–2.5 cm. wide (*Eulycianthes*) ..... **1. S. lycioides**

Berry 2-celled, lacking sclerotic partitions, many-seeded; leaves over 2.5 cm. wide.

Plants herbaceous or suffrutescent, prostrate or climbing, radicant at nodes. Flowers solitary; hairs simple.

Leaves ovate-elliptic, obviously longer than broad; filaments unequal, two 1 mm. long, three 1.5–1.8 mm. long (*Kittoides*) .. **2. S. profunderugosum**

Leaves cordate or reniform, as wide as long; filaments equal, 0.9–1 mm. long (*Asaropsis*) ..... **3. S. asarifolium**

Plants shrubs or trees, not radicant at the nodes.

A. Filaments unequal; hairs at least partly stellate or furcate (except in *S. cyathocalyx*) (*Eupolymeris*).

Calyx truncate, teeth wholly lacking.

Inflorescence 2–5-flowered; hairs all simple; corolla 12 mm. long; one filament 2 mm. long, four 1 mm. long ... **4. S. cyathocalyx**

Inflorescence 10–14-flowered; hairs stellate; corolla 18 mm. long; one filament 4.5 mm. long, four 1.5 mm. long ... **5. S. integrum**

Calyx truncate, 5- or 10-toothed below the margin.
Calyx teeth 5 only---------- **6. S. quinquelobatum**
Calyx teeth 10.
Anthers connate in pairs, one free; leaf blades 12.5–15.7 cm. long, coriaceous, shining, glabrous on both sides at maturity. **7. S. semiconnatum**
Anthers all free; leaves otherwise.
Hairs of stems glandular at apex---------- **8. S. magdalenense**
Hairs eglandular.
Calyx with reflexed teeth borne at or below the middle, the upper part forming a membranous cup 2.5–3 mm. long, this truncate or slightly lobed---------- **9. S. urnigerum**
Calyx otherwise, the apical part not membranous.
Longer calyx teeth 3–7 mm. long.
Anthers stellate-pubescent on the connective; longer calyx teeth 5–7 mm. long. Hairs of stems and leaves stipitate---------- **10. S. dendriticothrix**
Anthers glabrous on connective; longer calyx teeth 3–4 mm. long.
Longer filament 6 mm. long, the four shorter 2–2.5 mm. long; anthers 6.5 mm. long; leaves subglabrous at maturity except on veins---------- **11. S. caucaense**
Longer filament 3–4 mm. long the four shorter 1.5–2 mm. long; anthers 5 mm. long; leaves subtomentose at maturity---------- **12. S. meridionale**
Longer calyx teeth 2 mm. long or less.
Calyx teeth spreading or reflexed in fruit, not exceeding the calyx tube. Young branchlets closely ferruginous-tomentose; leaves 4–7 cm. broad.
Leaf blades rounded at base---------- **13. S. pauciflorum**
Leaf blades cuneate at base---------- **14. S. crassidens**
Calyx teeth suberect, exceeding the calyx tube.
Stems, leaves, and calyx densely ferruginous-tomentose.
Berry 10–12 mm. in diameter (teste Bitter). **15. S. ornatum**
Stems glabrous at maturity; berry 6–8 mm. in diameter.
Leaves ovate, rounded at base, abruptly decurrent into petiole.
Leaf blades 4–8 cm. long, 2.8–4 cm. broad, persistently stellate-pubescent; corolla rather densely hairy; calyx stellate-pubescent; pedicels 1.5–2.3 cm. long; inflorescence 4–6-flowered---------- **16. S. lentum**
Leaf blades 9–10 cm. long, 4–4.7 cm. broad, glabrescent at maturity; corolla papillose; calyx nearly glabrous; inflorescence 1–5-flowered--- **17. S. geminatum**

AA. Filaments equal; hairs all simple (*Simplicipila*).
Calyx truncate, without teeth---------- **18. S. holocalyx**
Calyx truncate, 10-toothed below the margin.
Inflorescence 15–25-flowered; corolla about 5 mm. long. Leaf blades densely and closely strigose on both sides, long-acuminate, the smaller of a pair conform; fruit subspherical--- **19. S. radiatum**
Inflorescence 1–5-flowered; corollas larger.
Corolla commonly 9–11 mm. long.
Flowers solitary, larger leaves 1.3–5.5 cm. wide. Leaves glabrate above, setulose on veins beneath----- **20. S. xylopiifolium**

Flowers about 5 in an axil; larger leaves 6.5–8.5 cm. wide.
21. S. ulei

Corolla 15–25 mm. long.
Smaller leaf of a pair stipule-like, 1 cm. long or less, orbicular, rounded at apex---------- **22. S. cundinamarcae**
Smaller leaf over 1 cm. long, acute.
Stems and leaves substrigose---------- **23. S. lasiophyllum**
Stems and leaves hispid---------- **24. S. lehmannii**

1. **Solanum lycioides** L. Mant. Pl. 45. 1767.
Solanum lycioides var. *tomentosum* Dunal, Hist. Sol. 174. 1813. Type from Peru, *Ruiz.*
Solanum phillyreoides H. & B. ex Dunal, Sol. Syn. 24. 1816. Type from between Tenerife and Badillas, Magdalena Valley, Colombia, *Humboldt.*
Solanum candicans Dunal, Sol. Syn. 23. 1816. Type from Peru, *Ruiz.*
Solanum lycioides var. *iodasterum* Dunal in DC. Prodr. **13**[1]: 162. 1852. Type from San Antonio, Ecuador, *Hartweg* 1302.
Fregirardia angustifolia Dunal, op. cit. 506. Type from San Antonio, Ecuador, *Hartweg* 1302, erroneously cited as 1802.
Solanum lycioides var. *parvifolium* Wedd. Chlor. And. **2**: 107. *pl. 55.* 1857. Type from Prov. Tacna, Peru, *Weddell.*
Solanum pseudolycioides Rusby, Bull. Torrey Club **26**: 193. 1899. Type from La Paz, Bolivia, alt. 3,000 meters, *Rusby* 833 (isotype US).
Solanum lycioides var. *angustifolium* Dammer, Bot. Jahrb. Engler **49**: 216. 1913 (*nomen nudum*).
Lycianthes lycioides Hassl. Ann. Cons. Jard. Genève **20**: 181. 1917.
Lycianthes candicans Hassl. loc. cit.
Lycianthes lycioides var. *parcipila* Bitter, Abh. Naturw. Ver. Bremen **24**: 325. 1919. Type from Calicali near Quito, Ecuador, *Lehmann* 383b.
Lycianthes lycioides var. *brachyodon* Bitter, loc. cit. Type from Río Gaillabamba, Prov. Pichincha, Ecuador, *Stuebel* 51a.
Lycianthes lycioides var. *iodastera* Bitter, loc. cit.
Lycianthes lycioides subsp. *tomentosa* Bitter, op. cit. 327.
Lycianthes lycioides subsp. *parvifolia* Bitter, op. cit. 328.

As the number of synonyms suggests, this species is exceedingly variable, especially in the size and pubescence of the leaves. It is abundant throughout most of the Andes.

2. **Solanum profunderugosum** (Bitter) Morton, comb. nov.
Lycianthes profunderugosa Bitter, Abh. Naturw. Ver. Bremen **24**: 406. 1919
Type: *Lehmann* 6987. Bitter's specimen lacked locality data. The entry for this number in Lehmann's notebook, a copy of which is in the National Museum, reads as follows: "Colombia. Grows on steep mountain slopes on the western slopes of the western Andes of Popayán, 1,600–2,200 meters. Flowers in March and April."

A specimen from La Gallera, Micay Valley, El Cauca, alt. 2,000–2,200 meters, July 1, 1922, collected by E. P. Killip (No. 7949), agrees with the description and with a photograph of the type.

3. **Solanum asarifolium** Kunth & Bouché, see page 62.

4. **Solanum cyathocalyx** Van Heurck & Muell. Arg. Obs. Bot. 65. 1870.
Lycianthes cyathocalyx Bitter, Abh. Naturw. Ver. Bremen **24**: 400. 1919.
Type from Chanduy, Prov. Guayas, Ecuador, *Spruce* 6501.

5. **Solanum integrum** Morton, nom. nov.
Lycianthes sanctae-marthae Bitter, Abh. Naturw. Ver. Bremen **24**: 377. 1919, non *Solanum sanctae-marthae* Bitter (1913).
Type from Santa Marta, Colombia, *H. H. Smith* 1189 (isotype US).

6. Solanum quinquelobatum Morton, nom. nov.

Lycianthes floccosa Bitter, Abh. Naturw. Ver. Bremen **24**: 398. 1919, non *Solanum floccosum* Mart. & Gal. (1845).

Type from Chunchí, Andes of Quito, Ecuador, *Spruce* 6036.

7. Solanum semiconnatum Morton, nom. nov.

Lycianthes coriacea Bitter, Abh. Naturw. Ver. Bremen **24**: 379. 1919, non *Solanum coriaceum* Dunal (1813).

Type from Tuquerres, road to Barbacoas, Colombia, *Triana*.

8. Solanum magdalenense Morton, nom. nov.

Solanum campylocladum var. *magdalenae* Dunal in DC. Prodr. **13**[1]: 173. 1852, non *S. magdalenae* Dammer (1906).

Lycianthes magdalenae Bitter, Abh. Naturw. Ver. Bremen **24**: 381. 1919.

Type from Magdalena Valley, Colombia, *Goudot* in 1846.

A recent collection of this rare species is: Vicinity of Barranca Bermeja, Magdalena Valley, Santander, Colombia, alt. 100-500 meters, *Haught* 1463.

9. Solanum urnigerum (Bitter) Morton, comb. nov.

Lycianthes urnigera Bitter, Abh. Naturw. Ver. Bremen **24**: 376. 1919.

Type from Ocaña, Norte de Santander, Colombia, *Schlim* 1120.

A second collection is: Mocoa, Comisaría del Putumayo, Colombia, *García* 4608.

10. Solanum dendriticothrix (Bitter) Morton, comb. nov.

Lycianthes dendriticothrix Bitter, Abh. Naturw. Ver. Bremen **24**: 375. 1919.

Type from Arracochol and Quebrada Grande, Dept. Cundinamarca, *Triana* (photograph US).

Lycianthes herbert-smithii Rusby (Bull. Torrey Club **53**: 213. 1926), based on *H. H. Smith* 1179 (isotype US) from Sierra del Líbano, Santa Marta, Colombia, is probably a synonym.

11. Solanum caucaense (Bitter) Morton, comb. nov.

Lycianthes caucaensis Bitter, Abh. Naturw. Ver. Bremen **24**: 359. 1919.

Type from Miraflores, above Palmira, Dept. El Cauca, Colombia, alt. 1,600 meters, *Pittier* 884 (US).

The typical form of the species has the corolla obviously stellate-pubescent outside along the middle of the lobes. In the lowlands of western Colombia occurs the following variety.

11a. Solanum caucaense var. **glabrescens** Morton, var. nov.

A var. *typica* corollis apicibus loborum exceptis omnino glabris differt.

Differs from the typical variety in the corolla being glabrous except at the apices of the lobes.

Type in the U. S. National Herbarium, No. 1,519,156, collected at Tutunendo, Intendencia del Chocó, Colombia, at 80 meters elevation, May 19–20, 1931, by W. A. Archer (No. 2132).

ADDITIONAL COLLECTIONS EXAMINED: Quibdó, Río Atrato, Chocó, *Archer* 1919; Andagoya, Chocó, *Killip* 35494.

12. Solanum meridionale Morton, nom. nov.

Lycianthes columbiana Bitter, Abh. Naturw. Ver. Bremen **24**: 372. 1919, non *Solanum columbianum* Dunal (1852).

Type from between Tenerife and Badillas, Magdalena Valley, Colombia, *Humboldt* (photograph US).

A second collection is: La Cumbre, Dept. El Valle, Colombia, alt. 1,600–2,000 meters, *Pennell* 5406.

13. Solanum pauciflorum Vahl, Eclog. Amer. **1**: 20. 1796.

Solanum neglectum Dunal, Hist. Sol. 177. 1813. Type from West Indies, *Plumier*.

Solanum speciosum Dunal, op. cit. 179. Type from West Indies, *Plumier*.

Lycianthes pauciflora Bitter, Abh. Naturw. Ver. Bremen **24**: 341. 1919.

Bitter records this species only from the Lesser Antilles, Trinidad, and Tobago. It grows also in Venezuela: Hills of Guaremales at La Fortaleza on road from Puerto Cabello to San Felipe, State of Carabobo, alt. 100–500 meters, *Pittier* 8803. Between Ocumare and Maracay, State of Aragua, *Pittier* 11867. Rancho Grande, State of Aragua, alt. 1,040 meters, *L. Williams* 10269.

14. Solanum crassidens Morton, nom. nov.

Lycianthes ecuadorensis Bitter, Abh. Naturw. Ver. Bremen **24**: 363. 1919, non *Solanum ecuadorense* Bitter (1920).

Type from Balao, Ecuador, *Eggers* 14386.

ADDITIONAL SPECIMEN:

ECUADOR: Archidona, Prov. Napo-Pastaza, alt. 650 meters, *Mexia* 7312.

15. Solanum ornatum Morton, nom. nov.

Lycianthes ferruginea Bitter, Abh. Naturw. Ver. Bremen **24**: 339. 1919, non *Solanum ferrugineum* Jacq. (1798).

Type from Colonia Tovar, Venezuela, *Gollmer*.

I have seen a photograph of *Moritz* 1642, the second specimen cited by Bitter, and there is in the National Herbarium a specimen merely labeled "Colombia, Moritz," which agrees with the photograph. The following specimens are to be referred to this species:

VENEZUELA: Colonia Tovar, State of Aragua, alt. 1,800–2,000 meters, *Pittier* 13514. Costabo, State of Miranda, *Tamayo* 397.

COLOMBIA: Líbano, Dept. Tolima, alt. 1,100–1,300 meters, *Pennell* 343. *Mutis* 1983, sin. loc.

16. Solanum lentum Cav. Icon. Pl. **4**: 336. *pl. 308*. 1797.

Solanum cumanense Roem. & Schult. Syst. Veg. **4**: 662. 1819. Type from Cumaná, Venezuela, *Humboldt* 71 (photograph US).

Solanum virgatum var. *caracasanum* O. E. Schulz in Urban, Symb. Antill. **6**: 190. 1909. Type from Caracas, *Humboldt* 748.

Lycianthes lenta Bitter, Abh. Naturw. Ver. Bremen **24**: 364. 1919.

Lycianthes lenta var. *endopsila* Bitter, op. cit. 367, *nom. abort.* Type from Caracas, *Humboldt* 748.

Lycianthes lenta var. *scotinophila* Bitter, loc. cit. Type from San Mateo, State of Aragua, Venezuela, *Otto* 788.

VENEZUELA: La Ceiba, at sea level, *E. Reed* 920. Río Chico, State of Miranda, *Jahn* 1211, 1248. Santa Rosa, State of Lara, *Pittier* 13088. Lara, *Saer* 118. Barquisimeto, Turbio River, *Pittier* 11179.

COLOMBIA: Barranquilla, *Elias* 934. San Martín de Loba, Dept. Bolívar, *Curran* 27, 37.

17. Solanum geminatum Vahl, Eclog. Amer. **1**: 21. 1796.

Solanum sylvaticum H. & B. ex Dunal, Hist. Sol. 24. 1816. Type from Cumaná and Bordones, Venezuela, *Humboldt*.

Lycianthes geminata Bitter, Abh. Naturw. Ver. Bremen **24**: 392. 1919.

Type from French Guiana, *Rohr*.

VENEZUELA: Guaremales, State Carabobo, alt. 10–100 meters, *Pittier* 9404.

COLOMBIA: Turbaco, Bolívar, alt. 200–300 meters, *Killip & Smith* 14311. Santa Marta, *H. H. Smith* 1177. Calamar, Bolívar, alt. 20 meters, *Killip & Smith* 14721.

18. Solanum holocalyx (Bitter) Morton, comb. nov.

Lycianthes holocalyx Bitter, Abh. Naturw. Ver. Bremen **24**: 459. 1919.

Type from Santo Domingo, Ecuador, *Sodiro* 114/38 (photograph US).

PERU: Balsapuerto, Loreto, alt. 150–550 meters, *Killip & Smith* 28446, 28507, 28555, 28557, 28572.

The following specimens represent the same, or a very closely allied species for which there is no available name.

PERU. JUNIN: Colonia Perené, alt. 600 meters, *Killip & Smith* 25152. Río Paucartambo Valley near Perené Bridge, *Killip & Smith* 25314. Near La Merced, east of Quimirí Bridge, alt. 800–1,300 meters, *Killip & Smith* 23940. SAN MARTÍN: Juan Jui, Alto Río Huallaga, alt. 400–800 meters, *Klug* 4261.

19. Solanum radiatum Sendtn. in Mart. Fl. Bras. **10**: 53. 1846.

Lycianthes radiata Bitter, Abh. Naturw. Ver. Bremen **24**: 433. 1919.

Type from between Tena and La Mesa, Bogotá, Colombia, *Hartweg* 1293 (photograph US).

COLOMBIA: El Gigante, Huila, *Ariste-Joseph* in 1920. Mount San Martín, Santander, alt. 2,300–2,500 meters, *Killip & Smith* 19136. Vicinity of Charta, Santander, *Killip & Smith* 19293. Mount Peña Blanca, Santander, alt. 2,500–2,600 meters, *Killip & Smith* 19263. Vicinity of La Baja, alt. 3,000 meters, *Killip & Smith* 18117. Loso, Norte de Santander, *Killip & Smith* 20473. Near Medellín, Antioquia, *Archer* 1090. Pinares above Salento, Caldas, 2,700–2,900 meters, *Pennell* 9326. La Ceja, Antioquia, *Daniel* 2183. Florida, *Pérez Arbeláez* 2560a. Salto de Tequendama, Cundinamarca, alt. 2,250–2,300 meters, *Cuatrecasas* 206. La Sierra, 18 km. north of Medellín, Antioquia, *Archer* 1364.

From description *Solanum goudotii* Dunal (*Lycianthes goudotii* Bitter) does not seem to differ appreciably.

20. Solanum xylopiifolium Dunal in DC. Prodr. **13**[1]: 179. 1852.

Lycianthes xylopiifolia Bitter, Abh. Naturw. Ver. Bremen **24**: 454. 1919.

Lycianthes xylopiifolia var. *intermedia* Bitter, op. cit. 455. Type from Colonia Tovar, Venezuela, *Moritz* 345.

Lycianthes xylopiifolia var. *maxima* Bitter, op. cit. Type from Colonia Tovar, Venezuela, *Gollmer*.

Type from Colonia Tovar, Venezuela, *Moritz* 825.

VENEZUELA: Agua Negra, D. F., *Tamayo* 1229. Colonia Tovar, State Aragua, *Pittier* 9378, 10036, 10057; *Allart* 318.

COLOMBIA. SANTANDER: Río Suratá Valley, alt. 2,000–2,300 meters, *Killip & Smith* 16674. Vicinity of California, alt. 2,800 meters, *Killip & Smith* 16891. Mount San Vicente, *Killip & Smith* 18998. Mount San Martín, *Killip & Smith* 19169. La Baja, *Killip & Smith* 17191. NORTE DE SANTANDER: Pamplona to Toledo, alt. 2,800–3,000 meters, *Killip & Smith* 19994. Pica-Pica Valley, above Tapatá, alt. 2,100–2,400 meters, *Killip & Smith* 20212. Loso, *Killip & Smith* 20464.

21. Solanum ulei (Bitter) Morton, comb. nov.

Lycianthes ulei Bitter, Abh. Naturw. Ver. Bremen **24**: 437. 1919.

Lycianthes ulei subsp. *dolichodonta* Bitter, op. cit. 438. Type from Balao, Ecuador, *Eggers* 14409 (isotype US).

Lycianthes ulei var. *strigulosa* Bitter, loc. cit. Type from San Miguel, Ecuador, *Sodiro* 114/46.

Type from Deringal San Francisco, Río Acre, Amazonas, Brazil, *Ule* 9764 (isotype US).

22. Solanum cundinamarcae (Bitter) Morton, comb. nov.

Lycianthes cundinamarcae Bitter, Abh. Naturw. Ver. Bremen **24**: 447. 1919.

Type from Cipacón, Dept. Cundinamarca, Colombia, alt. 2,800 meters, *Lehmann* 2602.

COLOMBIA: Albán, Cundinamarca, alt. 1,600 meters, *Guevara Amórtegui* 275.

23. Solanum lasiophyllum H. & B. ex Dunal, Sol. Syn. 25. 1816.

?*Solanum quindiuense* Zahlbr. Beih. Bot. Centralbl. **13**: 82. 1902. Type from Quindío, Colombia, alt. 2,700–3,400 meters, *Princess Therese.*

Lycianthes lasiophylla Bitter, Abh. Naturw. Ver. Bremen **24**: 449. 1919.

Type from between Menezes and Teindala, Andes of Pasto, Colombia, *Humboldt.*

The following specimen seems to agree fairly well with the description:

COLOMBIA: Aguabonita, below San Miguel, Dept. Cundinamarca, alt. 2,700 meters, *Balls* 7414.

24. Solanum lehmannii (Bitter) Morton, comb. nov.

Lycianthes lehmannii Bitter, Abh. Naturw. Ver. Bremen **24**: 444. 1919.

Lycianthes lehmannii subsp. *gibbosiaspera* Bitter, op. cit. 445. Type from Páramo de Guanacas, Popayán, Dept. El Cauca, Colombia, *Lehmann* 5561.

Type from Alto de Cuitambo on Mount Sotará, Colombia, *Lehmann* 6192 (photograph US).

COLOMBIA. EL CAUCA: Río Flautas, Río Paez Valley, alt. 2,900 meters, *Pittier* 1217. Paletará to Calaguala, alt. 3,000–3,200 meters, *Pennell* 7110. Carpinterías, 2,450–2,500 meters, *Pérez Arbeláez & Cuatrecasas* 6174. Cerro de Munchique, alt. 2,000–2,500 meters, *Pérez Arbeláez & Cuatrecasas* 6216.

Lycianthes rufinervia Rusby, based on *Bassovia ferruginea* Rusby (type from Santa Marta, *H. H. Smith* 1182), is very close to *S. lehmannii.*

DUBIOUS SPECIES

SOLANUM CHRYSOPHYLLUM H. & B. ex Dunal, Sol. Syn. 25. 1816.

Type: "Crescit in Regno Quitensi," *Humboldt.*

SOLANUM LANUGINOSUM H. & B. ex Dunal, Sol. Syn. 25. 1816.

Type: "Crescit in Regno Quitensi prope Mulalo," *Humboldt.*

LYCIANTHES HYPOCHRYSEA Bitter, Abh. Naturw. Ver. Bremen **24**: 452. 1919.

Type from Nanegal Valley, Ecuador, *Sodiro* 114/37 (photograph US).

Since this may be identical with one of the two old species of Humboldt and Bonpland mentioned above, it does not seem desirable to transfer it to *Solanum.* The following specimen apparently belongs here:

ECUADOR: Tena, Prov. Napo-Pastaza, alt. 400 meters, *Mexia* 7148.

LYCIANTHES SODIROI Bitter, Abh. Naturw. Ver. Bremen **24**: 436. 1919.

Type from Mount Corazón, Ecuador, alt. 2,000–2,800 meters, *Sodiro* 114/40 (photograph US).

Apparently to be referred to this species is the following specimen:

ECUADOR: Quevedo, Cantón Vinces, Prov. Los Ríos, alt. 50 meters, *Mexia* 6592.

LYCIANTHES NOVOGRANATENSIS Moldenke, Phytologia **1**: 16. 1933.

Type from El Umbo Region, Colombia, *Lawrance* 478.

From description this species is probably the same as *S. xylopiifolium.*

LYCIANTHES RECTICARPA Rusby, Bull. Torrey Club **53**: 210. 1926.

Type from Santa Marta, Colombia, *H. H. Smith.*

THE SPECIES OF SOLANUM, SECTION LYCIANTHES, IN ARGENTINA AND PARAGUAY

KEY TO SPECIES

Berry 8-celled, the partitions sclerotic, each cell enclosing a single seed; leaves not over 1 cm. wide ---------- **1. S. lycioides**

Berry 2-celled, the partitions not sclerotic, many-seeded; leaves over 1 cm. wide.

Stems creeping, rooting at the nodes; flowers solitary; leaf blades cordate, as wide as long ---------- **2. S. asarifolium**

Stems erect, not rooting at the nodes; flowers fasciculate; leaf blades not cordate, longer than broad.

Filaments strongly unequal, one 6 mm. long, the other four 2 mm. long.

Corolla white, 2.3–3 cm. broad; anthers 5 mm. long; hairs all stellate. **3. S. australe**

Filaments shorter, less strongly unequal.

Anthers 3 mm. long and 1.5–2 mm. wide; corolla purple, 2–2.5 cm. broad; hairs of calyx and upper leaf surface mostly simple; calyx lobes strongly unequal ---------- **4. S. rantonnetii**

Anthers 2 mm. long, 0.8 mm. broad; corolla white, 1.6 cm. broad; hairs of calyx and upper leaf surface almost all branched; calyx lobes subequal. **5. S. saltense**

1. Solanum lycioides L. See page 57.

Only var. *parvifolium* Wedd. occurs in this region. It has been found only in the Province of Jujuy at high elevations (about 3,000 meters).

2. Solanum asarifolium Kunth & Bouché, Ind. Sem. Hort. Berol. **1845:** 10. 1845; Linnaea **19:** 386. 1847.

Solanum violifolium var. *majus* Dunal in DC. Prodr. **13**[1]: 164. 1852. Type from Santa Cruz, Bolivia, *d'Orbigny* 619.

Solanum chodatianum Huber, Bol. Mus. Goeldi **4:** 602. *f. 7a, b.* 1906. Type from Contamana, Brazil, *Huber.*

Solanum violifolium f. *chacoense* Hassl. Repert. Sp. Nov. Fedde **15:** 220. 1918. Type from Río Pilcomayo, Paraguay, *Rojas* 275.

Solanum violifolium var. *asarifolium* Hassl. loc. cit.

Solanum violifolium var. *decadontum* Hassl. loc. cit. Type from Río Pilcomayo, Paraguay, *Morong* 920 (isotype US).

Lycianthes asarifolia Bitter, Abh. Naturw. Ver. Bremen **24:** 423. 1919. Type from a cultivated plant in Berlin (photograph US).

VENEZUELA: Guaremales, *Pittier* 9129. Barquisimeto, Lara, *Saer* 263. Guinand Estate, Siquire Valley, Miranda, *Pittier* 5972. La Molea, *Eggers* 13534.

BOLIVIA: Cochabamba, *Bang* 1235. Charagua, Chaco, *Cárdenas* 2625. Without locality, *Bang* 2521.

BRAZIL: Seringal San Francisco, Amazonas, *Ule* 9761. Coxipó da Ponte, Cuyabá, Matto Grosso, *Kuhlmann* 4506.

ARGENTINA: Campo Grande, Orán, Salta, alt. 600 meters, *Venturi* 7763.

3. Solanum australe Morton, nom. nov.

Solanum pseudolycioides Chod. & Hassl. Bull. Herb. Boiss. II. **4:** 84. 1904, non Rusby (1899).

Lycianthes pseudolycioides Bitter, Abh. Naturw. Ver. Bremen **24:** 352. 1919. Type from Arroyo Mocoy, Paraguay, *Hassler* 4912.

RANGE: Paraguay and Brazil.

PARAGUAY: Alto Paraná, *Fiebrig* 5692.

4. **Solanum rantonnetii** Carr. ex Lescuyer in Hérincq, Hort. Franc. II. **1**: 197. *pl. 16*. 1859.

Solanum corniculatum Hiern in Warming, Nat. For. Kjöbenhavn Vid. Medd. **29**: 45. 1877. Type from Brazil, *Glaziou* 1078.

Solanum urbanum Morong, Ann. N. Y. Acad. **7**: 177. 1892. Type from Asunción, Paraguay, *Morong* 147.

Solanum muticum N. E. Brown, Kew Bull. **1894**: 6. 1894. Type from a cultivated plant originally from Paraguay.

A detailed description is given by Bitter (Repert. Sp. Nov. Fedde **12**: 458. 1913).

5. **Solanum saltense** (Bitter) Morton, comb. nov.

Lycianthes saltensis Bitter, Abh. Naturw. Ver. Bremen **24**: 335. 1919.

Type from Cuachipas, Province Salta, Argentina, *Lorentz & Hieronymus*.

ARGENTINA: El Duraznito, alt. 550 meters, *Venturi* 1667. La Posta, Sierra de Medina, alt. 800 meters, *Venturi* 2392. Cerro del Campo, alt. 1,500 meters, *Venturi* 10344, 10363. Las Brenas, alt. 250 meters, *Venturi* 10186.

The name *S. saltense* is unfortunately much like that of the Brazilian species *S. saltiense* S. Moore, but both must stand since they differ by a letter and have different derivations.

THE SPECIES OF SOLANUM, SECTION LYCIANTHES, IN BRAZIL

KEY TO SPECIES

Stems creeping, rooting at the nodes; flowers solitary. Hairs all simple (*Asaropsis*).
- Calyx teeth 5 ---- **1. S. asarifolium**
- Calyx teeth 10, alternately unequal ---- **2. S. violifolium**

Stems erect, not rooting at the nodes; flowers not solitary. Calyx teeth 10, alternately unequal.
- Filaments unequal (*Eupolymeris*).
  - Hairs all simple. Calyx teeth in fruit 8–9 mm. long (5–6.5 mm. long in flower) ---- **3. S. longidentatum**
  - Hairs at least partly stellate.
    - Hairs of calyx and upper leaf surface mostly simple; corolla violet; filaments not strongly unequal, three 2–3 mm. long, two 1.5 mm. long ---- **4. S. rantonnetii**
    - Hairs all stellate; corolla white (not known in *S. japurense* or *S. stellato-pubescens*); filaments strongly unequal, one about 3 times as long as the other four (not known in *S. stellato-pubescens*).
      - Calyx lobes in fruit 5–7 mm. long; berry 1.6–2 cm. in diameter. **5. S. stellato-pubescens**
      - Calyx lobes in fruit not over 4 mm. long; berry 1–1.4 cm. in diameter.
        - Flowers 2–3 in an axil; leaf blades nearly glabrous beneath at maturity except on the veins ---- **6. S. japurense**
        - Flowers 4–9 in an axil; leaf blades persistently pubescent beneath.
          - Corolla hairy on back of lobes ---- **7. S. hypomalacum**
          - Corolla glabrous except on margins and apex ---- **8. S. australe**

Filaments equal. Hairs all simple. (*Simplicipila*).
- Corolla 15–16 mm. in diameter; anthers 4 mm. long; primary veins 6 or 7 pairs ---- **9. S. coffeifolium**
- Corolla 10 mm. in diameter; anthers 2 mm. long; primary veins 13 or 14 pairs ---- **10. S. ulei**

1. **Solanum asarifolium** Kunth & Bouché. See page 62.

2. **Solanum violifolium** Schott ex Spreng. Syst. Veg. **4,** Cur. Post. 403. 1827.
Boldoa repens Spreng. Syst. Veg. **1:** 179. 1825, non *Solanum repens* alior.
Lycianthes violifolia Bitter, Abh. Naturw. Ver. Bremen **24:** 425. 1919.
Type: Not stated.
BRAZIL: Rio de Janeiro, *Ule* (Mus. Nac. Rio Jan. 25614); *Brade* 10747 (Mus. Nac. Rio Jan. 25751). Excelsior, Rio de Janeiro, *Brade* (Mus. Nac. Rio Jan. 25855). Paraná, *Dusén* 4131 (Mus. Nac. Rio Jan. 25876).

3. **Solanum longidentatum** (Bitter) Morton, comb. nov.
Lycianthes longidentata Bitter, Abh. Naturw. Ver. Bremen **24:** 356. 1919.
Type from Estella, Seringal San Francisco, Rio Acre, Amazonas, Brazil, *Ule* 9733 (isotype US).
BRAZIL: Near Palmares, São Paulo de Olivença, Amazonas, *Krukoff* 8443.

4. **Solanum rantonnetii** Carr. See page 63.
BRAZIL: Campinas, São Paulo, *Campos Novaes* 6138.

5. **Solanum stellato-pubescens** (Dunal) Morton, comb. nov.
Solanum japurense var. *stellato-pubescens* Dunal in DC. Prodr. **13**[1]**:** 174. 1852.
Lycianthes stellato-pubescens Bitter, Abh. Naturw. Ver. Bremen **24:** 351. 1919.
Type from Bahia, Brazil, *Sello.*
BRAZIL: Agua Preto, Bahia, *P. R. O. Silva* 1912 (Hoehne 35126).

6. **Solanum japurense** Dunal in DC. Prodr. **13**[1]**:** 174. 1852.
Lycianthes japurensis Bitter, Abh. Naturw. Ver. Bremen **24:** 350. 1919.
Type from Rio Japura, Amazonas, Brazil, *Martius.*

7. **Solanum hypomalacum** (Bitter) Morton, comb. nov.
Lycianthes hypomalaca Bitter, Abh. Naturw. Ver. Bremen **24:** 344. 1919.
Type from Estella, Seringal Auristella, Rio Acre, Amazonas, Brazil, *Ule* 9734 (isotype US).
BRAZIL: Tres Casas, Humayta, Amazonas, *Krukoff* 6364. Mouth of Rio Embira, Amazonas, *Krukoff* 4874.

8. **Solanum australe** Morton. See page 62.
BRAZIL: Hector Legrú, São Paulo, *Gehrt* (Hoehne 5343), Araraquara, São Paulo, *Loefgren* 4326 (Hoehne 15405), 1161 (Hoehne 15402).

9. **Solanum coffeifolium** (Bitter) Morton, comb. nov.
Lycianthes coffeifolia Bitter, Abh. Naturw. Ver. Bremen **24:** 432. 1919.
Type from Monte Mó, Amazonas, Brazil, *Ule* 9737 (isotype US).

10. **Solanum ulei** (Bitter) Morton. See page 60.
Type from Seringal San Francisco, Amazonas, Brazil, *Ule* 9764.

DUBIOUS SPECIES

LYCIANTHES CEARAENSIS Bitter, Abh. Naturw. Ver. Bremen **24:** 346. 1919.
Type from Serra de Maranguape, Ceará, Brazil, alt. 600 meters, *Ule* 9103 (isotype US).
I do not transfer this species to *Solanum* because it may be too near *S. ornatum* Morton (*Lycianthes ferruginea* Bitter). It is very near *S. guianense* Dunal also. The specific epithet would be invalid under *Solanum* because of the old species *Solanum cearense* Dunal.

THE SPECIES OF SOLANUM, SECTION LYCIANTHES, IN PERU

KEY TO SPECIES

Berry 8-celled, the partions sclerotic, each enclosing a single seed; leaf blades small, not over 2.5 cm. broad---------- **1. S. lycioides**

Berry 2-celled, the partions not sclerotic, many-seeded; leaf blades usually over 2.5 cm. broad.

Filaments unequal.

Stems glabrous or nearly so; leaves glabrous except on midribs and margins and in the vein axils beneath, the hairs all simple. Calyx teeth 4–8 mm. long.

Leaf blades 1.8–3.1 cm. broad, 6.5–8.5 cm. long; inflorescence 4–6-flowered---------- **2. S. acutangulum**

Leaf blades 5.5–8 cm. broad, 13.5–19.5 cm. long; inflorescence 10–12-flowered---------- **3. S. stenolobum**

Stems obviously pubescent, the hairs at least partly stellate or furcate; leaf blades usually hairy, at least when young.

Calyx teeth in flower 4–8 mm. long, unequal.

Hairs of stems and leaves eglandular; leaf blades nearly glabrous above except on veins, 6–8 cm. broad---------- **4. S. luxurians**

Hairs of stems and leaves at least partly glandular; leaf blades glandular-pilose above on the surface, 3–4.5 cm. broad---------- **5. S. sprucei**

Calyx teeth in flower 0.5–2.5 mm. long, equal or unequal.

Hairs all stellate, stipitate; filaments strongly unequal, one 4–5.5 mm. long, four 1–2 mm. long; leaf blades large, 6–14.5 cm. long, 3–6 cm. broad.

Leaf blades glabrous above except on veins; calyx teeth equal, 1 mm. long---------- **6. S. poeppigii**

Leaf blades stellate-pubescent all over upper surface; calyx teeth unequal, 1.5–2.5 mm. long---------- **7. S. glandulosum**

Hairs partly simple, partly furcate; filaments less strongly unequal, two 1.5–2 mm. long, three 2.5 mm. long; leaf blades smaller, 3.2–5.6 cm. long, 2–3 cm. broad---------- **8. S. jelskii**

Filaments equal. Hairs all simple.

Anthers at least partly connate. Leaves almost entirely glabrous. **9. S. coffeifolium**

Anthers all free.

Calyx teeth absent. Leaf blades large, oblique, glabrous above, strigose beneath---------- **10. S. holocalyx**

Calyx teeth present.

Calyx teeth minute, scarcely exceeding the truncate calyx margin. Leaf blades narrowly linear-lanceolate (0.4–1.3 cm. broad); corolla small, 12 mm. in diameter---------- **11. S. brachylobum**

Calyx teeth larger, exceeding the calyx margin.

Leaf blades large (12–20 cm. long), strongly oblique, glabrous above, strigose beneath especially on veins. Opposite leaf minute, stipuliform; stems strigose; inflorescence 2–5-flowered; primary veins 14–16 pairs---------- **12. S. conspicuum**

Leaf blades otherwise.

Primary leaf veins 12–18 pairs. Stems and leaves hirsute. **13. S. medusocalyx**

Primary leaf veins not over 10 pairs.

Smaller of the paired leaves stipuliform, orbicular, rounded at apex.

Leaf blades densely pubescent on both sides_ **14. S. chrysothrix**
Leaf blades glabrous except on midribs_ **15. S. biformifolium**
Smaller of the paired leaves more or less conform with the larger, acute.
Leaf blades 4.5–5 cm. broad, subsericeous-strigose on both surfaces; inflorescence about 5-flowered **16.S.densestrigosum**
Leaf blades narrower; inflorescence 1- or 2-flowered.
Leaf blades glabrous above except on veins_ **17. S. lineatum**
Leaf blades pubescent above.
Leaf blades not over 1 cm. broad_ **18. S. acutifolium**
Leaf blades broader_____ **19. S. tarmense**

1. Solanum lycioides L. See page 57 for synonymy.

Solanum dombeyi Dunal is close to this species but may be distinct. It differs chiefly in having relatively broader leaf blades, rounded rather than narrowed at base. It is known only from the type, collected between Tarma and Chinchiu, Dept. Junín, Peru, by Dombey (No. 245) (photograph US).

2. Solanum acutangulum Griseb. in Lechl. Berb. Amer. Austr. 58. 1857.

Solanum compressibaccatum Bitter, Repert. Sp. Nov. Fedde **12**: 456. 1913.
Type from the Department of Loreto, Peru, *Ule* 6800 (photograph US).
Lycianthes acutangula Bitter, Abh. Naturw. Ver. Bremen **24**: 357. 1919.
Lycianthes acutangula subsp. *compressibaccata* Bitter, op. cit. 358.
Type from San Gaván, Peru, *Lechler* 2354.

3. Solanum stenolobum Van Heurck & Muell. Arg. Obs. Bot. 69. 1870.

Bassovia stenoloba Britton in Rusby, Mem. Torrey Club **4**: 232. 1895.
Lycianthes stenoloba Bitter, Abh. Naturw. Ver. Bremen **24**: 358. 1919.
Type from Tarapoto, Peru, *Spruce* 4210 (photograph US).

4. Solanum luxurians Morton, nom. nov.

Lycianthes pearcei Bitter, Abh. Naturw. Ver. Bremen **24**: 355. 1919, non *Solanum pearcei* Britt. (1895).
Type from "Corico," Peru? *Pearce* s. n.

PERU (Dept. Loreto): Mishuyacu, near Iquitos, alt. 100 meters, *Killip & Smith* 29849; *Klug* 1321, 1484.

5. Solanum sprucei Van Heurck & Muell. Arg. Obs. Bot. 67. 1870.

Lycianthes sprucei Bitter, Abh. Naturw. Ver. Bremen **24**: 380. 1919.
Type from Tarapoto, Peru, *Spruce* 4352.

6. Solanum poeppigii (Bitter) Morton, comb. nov.

Lycianthes poeppigii Bitter, Abh. Naturw. Ver. Bremen **24**: 345. 1919.
Type from Maynas, Dept. Loreto, Peru, *Poeppig* 2406.

7. Solanum glandulosum Ruiz & Pav. Fl. Peruv. Chil. **2**: 35. *pl. 167, f. b.* 1799.

Solanum vitocense Dunal in DC. Prodr. **13**[1]: 348. 1852. Type from Vitoc near Tarma, Peru, *Ruiz* 39.
Lycianthes glandulosa Bitter, Abh. Naturw. Ver. Bremen **24**: 348. 1919.
Type from Peru, *Ruiz* (photograph US).

PERU (Dept. Loreto): Gamitanacocha, Río Mazán, alt. 100–125 meters, *Schunke* 178.

8. Solanum jelskii Zahlbr. Ann. Naturhist. Hofmus. Wien **7**: 7. 1892.

Lycianthes jelskii Bitter, Abh. Naturw. Ver. Bremen **24**: 399. 1919.
Type from Cutervo, Peru, *Jelski* 47 (photograph US).

9. Solanum coffeifolium (Bitter) Morton. See page 64 for synonymy.

PERU (Dept. Junín): Puerto Bermúdez, alt. 375 meters, *Killip & Smith* 26635.

10. Solanum holocalyx (Bitter) Morton. See page 60 for synonymy and citation of specimens.

11. Solanum brachylobum Van Heurck & Muell. Arg. Obs. Bot. 71. 1870.
Lycianthes brachyloba Bitter, Abh. Naturw. Ver. Bremen **24:** 457. 1919.
Type from Tarapoto, Peru, *Spruce* 459.

12. Solanum conspicuum Morton, nom. nov.
Lycianthes tarapotensis Bitter, Abh. Naturw. Ver. Bremen **24:** 440. 1919.
non *Solanum tarapotense* Van Heurck & Muell. Arg. (1870).
Type from Tarapoto, Peru, *Spruce* 4182.

There is in the National Herbarium a photograph of the second specimen cited by Bitter, namely, *Ule* 6483, collected at Tarapoto.

PERU (Dept. Loreto): Pongo de Manseriche, alt. 250 meters, *Mexia* 6347.

13. Solanum medusocalyx Bitter, Repert. Sp. Nov. Fedde **12:** 549. 1913.
Lycianthes medusocalyx Bitter, Abh. Naturw. Ver. Bremen **24:** 437. 1919.
Type from Sierra de Escaler, Dept. Loreto, Peru, alt. 1,200 meters, *Ule* 6804 (photograph US).

I identify with some doubt the following collection as this species:

PERU (Dept. Junín): Yapas, Pichis Trail, alt. 1,350–1,600 meters, *Killip & Smith* 25446.

14. Solanum chrysothrix (Bitter) Morton, comb. nov.
Lycianthes chrysothrix Bitter, Abh. Naturw. Ver. Bremen **24:** 448. 1919.
Lycianthes chrysothrix subsp. *dolichopoda* Bitter, Repert. Sp. Nov. Fedde **18:** 317. 1922. Type from Pataz, Dept. Libertad, Peru, *Weberbauer* 7401 (photograph US).
Type from Cassapi, Peru, *Poeppig* in 1829.

15. Solanum biformifolium Ruiz & Pav. Fl. Peruv. Chil. **2:** 32. *pl. 161, f.a.* 1799.
Lycianthes biformifolia Bitter, Abh. Naturw. Ver. Bremen **24:** 443. 1919.
Type from Chinchao, Peru, *Ruiz* (photograph US).

16. Solanum densestrigosum Bitter, Bot. Jahrb. Engler **50**, Beibl. **111:** 65. 1913.
Lycianthes densestrigosa Bitter, Abh. Naturw. Ver. Bremen **24:** 443. 1919.
Type from Peru, *Weberbauer* (photograph US).

17. Solanum lineatum Ruiz & Pav. Fl. Peruv. Chil. **2:** 31. *pl. 158, f. b.* 1799.
Lycianthes lineata Bitter, Abh. Naturw. Ver. Bremen **24:** 442. 1919.
Type from Muña, Peru, *Ruiz.*

18. Solanum acutifolium Ruiz & Pav. Fl. Peruv. Chil. **2:** 33. *pl. 162, f. b.* 1799.
Lycianthes acutifolia Bitter, Abh. Naturw. Ver. Bremen **24:** 453. 1919.
Type from Muña, Peru, *Ruiz* (photograph US).

19. Solanum tarmense (Bitter) Morton, comb. nov.
Lycianthes tarmensis Bitter, Abh. Naturw. Ver. Bremen **24:** 451. 1919.
Type from Huacapistana, Prov. Tarma, Dept. Junín, Peru, alt. 2,000 meters, *Weberbauer* 2141 (photograph US).

PERU (Dept. Junín): Huacapistana, alt. 1,800–2,400 meters, *Killip & Smith* 24322. Carapata, above Huacapistana, alt. 2,700–3,200 meters, *Killip & Smith* 24394.

DUBIOUS SPECIES

LYCIANTHES WEBERBAUERI Bitter, Abh. Naturw. Ver. Bremen **24:** 446. 1919.
Type from east of Chachapoyas, Amazonas, Peru, alt. 2,500–2,700 meters, *Weberbauer* 4452 (photograph US).

I do not transfer this and the following species to *Solanum*, because I am not convinced of their validity. In the foregoing key they will both run to *S. tarmense.*

LYCIANTHES ALOPECOCLADA Bitter, Abh. Naturw. Ver. Bremen **24:** 456. 1919.
Type from Cuchero, Peru, *Poeppig* 1075.

SOLANUM CUTACENSE H. B. K. Nov. Gen. & Sp. **3:** 38. 1818.
Type from Ayavaca and Río Cutaco, Peru, *Humboldt.*

SOLANUM HETEROCHONDRUM Bitter, Bot. Jahrb. Engler **54,** Beibl. **119:** 15. 1916.
Lycianthes heterochondra Bitter, Abh. Naturw. Ver. Bremen **24:** 335. 1919.
Type from Sandía, Peru, alt. 2,100–2,300 meters, *Weberbauer* 532 (isotype US).

THE SPECIES OF SOLANUM, SECTION LYCIANTHES, IN BOLIVIA

I have not studied the Bolivian species of *Lycianthes* to any extent. However, in order that all the South American species of the subgenus may be at least mentioned, I list below without comment those described from this country. It is very probable that some of those listed here are synonyms, and some of those described by Rusby may not belong in this section or even in the genus *Solanum* at all. All are endemic except the two widespread species *S. lycioides* and *S. asarifolium.* Very few of them have ever been referred to *Solanum,* so I list them all under *Lycianthes.*

1. **Lycianthes actinocalyx** (H. Winkl.) Bitter, Abh. Naturw. Ver. Bremen **24**: 338. 1919.
   Brachistus actinocalyx H. Winkl. Repert. Sp. Nov. Fedde **7:** 245. 1909. Type from Charopampa, near Mapiri, alt. 570 meters, *Buchtien* 1432 (isotype US).
   Brachistus virgatus H. Winkl. loc. cit. Type from San Carlos, near Mapiri, alt. 750 meters, *Buchtien* 1433 (isotype US).
   Lycianthes buchtienii Bitter, Abh. Naturw. Ver. Bremen **24:** 337. 1919.
2. **Lycianthes apiculata** Bitter, Abh. Naturw. Ver. Bremen **24:** 452. 1919.
   Type from Sirupaya, near Yanacachi, South Yungas, alt. 2,100 meters, *Buchtien* 327 p. p.
3. **Lycianthes asarifolia** (Kunth & Bouché) Bitter. See page 62.
4. **Lycianthes coccinea** (Rusby) Rusby, Bull. Torrey Club **53:** 210. 1926.
   Brachistus coccineus Rusby, Bull. N. Y. Bot. Gard. **8:** 117. 1912.
   Type from San Buenaventura, *R. S. Williams* 623 (isotype US).
5. **Lycianthes fasciculata** (Rusby) Bitter, Abh. Naturw. Ver. Bremen **24:** 334. 1919.
   Brachistus fasciculatus Rusby, Bull. N. Y. Bot. Gard. **4:** 423. 1907.
   Solanum fasciculatum Bitter, Repert. Sp. Nov. Fedde **13:** 100. 1914.
   Type from Bolivia, *Bang* 2871 (isotype US).
6. **Lycianthes fendleri** (Rusby) Rusby, Bull. Torrey Club **53:** 210. 1926.
   Bassovia fendleri Rusby, Bull. Torrey Club **26:** 197. 1899.
   Type from Yungas, *Rusby* 770.
7. **Lycianthes hispida** (Rusby) Rusby, Bull. Torrey Club **53:** 210. 1926.
   Brachistus hispidus Rusby, Bull. Torrey Club **26:** 162. 1899.
   Type from Guanai, *Bang* 2524.
8. **Lycianthes heterodonta** Bitter, Abh. Naturw. Ver. Bremen **24:** 333. 1919.
   Type from Sirupaya, near Yanacachi, alt. 2,100 meters, *Buchtien* **327,** p. p. (isotype US).
9. **Lycianthes hylophila** Bitter, Abh. Naturw. Ver. Bremen **24:** 336. 1919.
   Type from Prov. de la Cordillera, *Weddell* 3597.
10. **Lycianthes inaequilatera** (Rusby) Bitter, Abh. Naturw. Ver. Bremen **24:** 439. 1919.
    Bassovia inaequilatera Rusby, Mem. Torrey Club **6:** 90. 1896.
    Brachistus inaequilaterus Rusby, Bull. N. Y. Bot. Gard. **4:** 470. 1907.
    Type from between Tipuani and Guanai, Dept. La Paz, *Bang* 1708 (isotype US).

11. Lycianthes leptocaulis (Rusby) Rusby, Bull. Torrey Club **53**: 218. 1926.
Brachistus leptocaulis Rusby, Bull. Torrey Club **26**: 63. 1899.
Type from Guanai, *Bang* 2657.

12. Lycianthes lycioides L. See page 57.

13. Lycianthes medians Bitter, Repert. Sp. Nov. Fedde **18**: 317. 1922.
Type without locality, *Bang* s. n.

14. Lycianthes polycarpa Rusby, Bull. Torrey Club **53**: 212. 1926.
Type from Beni River, *Rusby* 798.

15. Lycianthes pyrifolia Rusby, Bull. Torrey Club **53**: 212. 1926.
Type from Espíritu Santo, near Cochabamba, alt. 750 meters, *Buchtien* 2816.

16. Lycianthes reflexa Rusby, Bull. Torrey Club **53**: 211. 1926.
Type from Bolivia, *Bang* 2617 (isotype US).

17. Lycianthes sancti-caroli (H. Winkl.) Bitter, Abh. Naturw. Ver. Bremen **24**: 354. 1919.
Brachistus sancti-caroli H. Winkl. Repert. Sp. Nov. Fedde **7**: 245. 1909.
Type from San Carlos near Mapiri, *Buchtien* 1439 (isotype US).

18. Lycianthes strigosa (Britton) Bitter, Abh. Naturw. Ver. Bremen **24**: 434. 1919.
Brachistus strigosus Britton in Rusby, Bull. Torrey Club **26**: 109. 1899.
Type from Yungas, alt. 1,900 meters, *Rusby* 786 (isotype US).

19. Lycianthes subfalcata (Rusby) Rusby, Mem. New York Bot. Gard. **7**: 349. 1927.
Brachistus subfalcatus Rusby, Bull. New York Bot. Gard. **8**: 117. 1912.
Type from San Buenaventura, *R. S. Williams* 660 (isotype US).

20. Lycianthes tomentella Rusby, Bull. Torrey Club **53**: 211. 1926.
Type from Yungas, *Bang* 630 (isotype US).

21. Lycianthes viridis Rusby, Mem. New York Bot. Gard. **7**: 350. 1927.
Type from Meguilla, *White* 439 (isotype US).

THE SPECIES OF SOLANUM, SECTION LYCIANTHES, IN THE GUIANAS

Only two species have ever been collected in any of the Guianas. They are known there from the original collections only.

1. Solanum guianense Dunal in DC. Prodr. **13**[1]: 166. 1852.
Lycianthes guianensis Bitter, Abh. Naturw. Ver. Bremen **24**: 347. 1919.
Type from French Guiana, *Martin*.

2. Solanum geminatum Vahl. See page 59.
Type from French Guiana, *Rohr*.

Section PSEUDOCAPSICUM

Solanum karstenii Dunal in DC. Prodr. **13**[1]: 151. 1852.
Type collected in Colombia by Karsten (photograph US).
This species is rather common in Venezuela but has apparently not been found again in Colombia except for the following recent collection: La Paz, Dept. Magdalena, *Haught* 2329.

Section TUBERARIUM

Solanum gigantophyllum Bitter, Repert. Sp. Nov. Fedde **11**: 368. 1912.
Type from Siambon, Tucumán, Argentina, *Lorentz & Hieronymus* 802.
Easily recognized by its large leaves, decurrent on the stem in broad wings.

Additional collections are:

ARGENTINA: Los Baños, Salta, alt. 1,000 meters, *Venturi* 9414. Volcán, Jujuy, alt. 2,600 meters, *Venturi* 9532.

Subgenus LEPTOSTEMONUM

Solanum allophyllum (Miers) Standley, Journ. Washington Acad. Sci. **17**: 16. 1927.

Pionandra allophylla Miers in Seem. Bot. Voy. Herald 174. 1857.

Solanum ellipsoideibaccatum Bitter, Repert. Sp. Nov. Fedde **11**: 486. 1913. Type from Santa Marta, Colombia, *H. H. Smith* 1153.

Known previously only from Panama and Colombia. It may now be reported from Venezuela.

COLOMBIA: La Popa, near Cartagena, Bolívar, *Killip & Smith* 14080.

VENEZUELA: San Martín, on Río del Palmar, Zulia, *Pittier* 10530. Vicinity of Mene Grande, Zulia, *Pittier* 10610.

Solanum asperrimum Bitter & Moritz, Repert. Sp. Nov. Fedde **16**: 393. 1920. Type from Las Lagunitas, Mérida, Venezuela, *Moritz* 1024 (photograph US).

Judged from the description and photograph a good many specimens from Venezuela, Colombia, Peru, and Brazil have been erroneously identified as this species. Of the specimens that I have seen, I should refer to it only the following:

COLOMBIA. NORTE DE SANTANDER: Loso, alt. 2,200–2,400 meters, *Killip & Smith* 20475. Between Pamplona and La Isla, *Killip & Smith* 19798. SANTANDER: Mesa de los Santos, alt. 1,500 meters, *Killip & Smith* 15071. BOYACÁ: Mount Chapón, alt. 1,200 meters, *Lawrance* 290.

Solanum confusum Morton, sp. nov.

Solanum clavatum sensu Bitter, Repert. Sp. Nov. Fedde **12**: 464. 1913, non Rusby (1896).

Solanum clavatum Rusby (Mem. Torrey Club **6**: 87. 1896) was based on *Bang* 1118 from Mount Tunari, Bolivia. Unfortunately this number is a mixture. One element has the anthers obtuse with large, introrse pores, and pedicels clavate and angled toward apex. It bears mature fruits. The other element has attenuate anthers with a small apical pore, terete, nonclavate pedicels and no fruits. Rusby's description applies to the former element, e. g., "pedicels clavate and quadrangular at summit; . . . anthers obtuse, the pores directed about equally upward, inward and laterally; . . . fruit dull, about 1 cm. in diameter." His description of the habit also applies only to this element—"glabrous, much-branched shrub, the branchlets crowded, irregular, short and stout, very leafy, the internodes 0.5–1 cm. long." In fact, the entire description, except perhaps for the maximum dimensions of the leaves, was apparently drawn from this element.

Later Rusby apparently realized that two species were involved, but seems to have misinterpreted his own species. On the sheet in the New York Botanical Garden that agrees with the description he crossed off the name *clavatum* and substituted *S. aureifolium* Rusby, a species founded on *Bang* 1119. He evidently believed that Bang's numbers 1118 and 1119 had become mixed. This is not true, however. There are three species involved. *Solanum aureifolium* bears a close habital similarity to the true *S. clavatum*, but it is different. Both belong to the section *Leiodendron*.

In 1913 Bitter founded his new section *Cyphomandropsis*, based on *Solanum stuckertii* Bitter of Argentina, and referred "*S. clavatum* Rusby" to it, remarking that Rusby's description showed a multitude of inaccuracies. He was basing his opinion on a specimen of *Bang* 1118 lent him from the National Herbarium. This specimen represents the second element of *Bang* 1118, as mentioned above;

and since it belongs to a different section of the genus from true *S. clavatum*, it is small wonder that Bitter found Rusby's description inaccurate.

Bitter gave a complete description in Latin of the species of the section *Cyphomandropsis* he was calling "*S. clavatum*." Inasmuch as this species has no available name, I am calling it **S. confusum.** The type is in the U. S. National Herbarium, No. 1,177,847, collected near snow-line on Mount Tunari, Bolivia, in 1891, by M. Bang (No. 1118 in part). Bitter's description need not be repeated here.

A second specimen of *S. confusum* is *Bang* 2618, from an unspecified locality in Bolivia. It was distributed as *S. clavatum* Rusby.

Solanum crinitipes Dunal in DC. Prodr. **13**[1]: 317. 1852.

Solanum formosum H. B. K. Nov. Gen. & Sp. **3**: 44. 1818, non Weinm. (1810). Type from Maypures, on Orinoco River, *Humboldt.*

Type from Ecuador, *Hartweg* 1300 (isotype NY).

This common species from Colombia and Ecuador has usually been identified as *S. formosum* H. B. K., which may not be the same. In any case the name is not available, being a homonym.

Solanum crotonifolium H. & B. ex Dunal, Sol. Syn. 18. 1816.

Type from Cartagena, Colombia, *Humboldt* (photograph US).

This species has remained obscure, because in the Prodromus Dunal placed it in the wrong subgenus. Although spineless it belongs in *Leptostemonum*, not in *Pachystemonum*, section *Anthoresis*, where Dunal placed it. The following collections are at hand:

COLOMBIA: La Dorada, Caldas, alt. 200–400 meters, *Haught* 2128. Mompos Island, Magdalena River, *Ariste-Joseph* in 1921. Doima, Tolima, alt. 700 meters, *Haught* 2447. Honda, Tolima, *Pennell* 3573. Fusugasugá to Pandi, Cundinamarca, alt. 1,000–1,300 meters, *Pennell* 2729. Bosa, Cundinamarca, *García* 4705.

Solanum fastigiatum Willd. Hort. Berol. 235. 1809.

A synonym is *Solanum regnellii* Hiern (Nat. For. Kjoeb. Vid. Medd. 1877–78: 54), based on *Regnell* I. 345, from Minas Geraes, Brazil (isotype US).

Solanum flagellare Sendtn. in Mart. Fl. Bras. **10**: 68. 1846.

Type from Brazil, *Sello* (photograph US).

The following specimens agree very well with the photograph:

BRAZIL (São Paulo): Pinheiros, *Loefgren* 1761 (Hoehne 15293). Ipiranga, *Edwall* (Hoehne 15296). Butantán, *Hoehne* 610. Casa Verde, *Kuhlmann* (Hoehne 31614).

Solanum hieronymi Kuntze, Rev. Gen. Pl. **3**[2]: 226. 1898.

Type from Río Juramento, Salta, Argentina, *Lorentz & Hieronymus* 361 (NY).

ARGENTINA. TUCUMÁN: Dept. Cruz Alta, alt. 460 meters, *Venturi* 2413. Estancia Las Paras, alt. 3,200 meters, *Venturi* 7046. CATAMARCA: Andalgalá, *Jörgensen* 1066. Anconquija, alt. 3,000 meters, *Venturi* 7045. SANTIAGO DEL ESTERO: Estancia El Remate, alt. 500 meters, *Venturi* 6042. Cerro El Remate, alt. 550 meters, *Venturi* 5686.

The vernacular name in Argentina is *pocote.*

Solanum hirsutissimum Standl. Journ. Washington Acad. Sci. **17**: 15. 1927.

Type from Panama.

In describing this species Standley remarked that it looked like an introduced weed but that he could find no name for it. I have not been able to find one either, although I feel fairly confident that it is introduced from the Old World. It is rather close to the commonly introduced Old World species *S. mammosum* L. It is evidently spreading, for it has turned up recently from Costa Rica and may now be reported from Ecuador.

ECUADOR: Valley of Pastaza River, Prov. Tungurahua, alt. 1,300–1,800 meters, *Hitchcock* 21785. Napo, Prov. Napo-Pastaza, alt. 400 meters, *Mexía* 7125.

Solanum hoehnei Morton, nom. nov.

Solanum decurrens Vell. Fl. Flum 89. 1825; Ic. **2**: *pl. 126*. 1827, non Balbis (1810).

Solanum alatum Dunal in DC. Prodr. **13**[1]: 234. 1852, non Moench. (1794).

BRAZIL: Organ Mountains, *Gardner*. Macahé, *Riedel* 394. Conceição, São Paulo, *Hoehne* 24490. Ribeirão Pires, São Paulo, *Edwall* 3228.

A peculiar form, with leaves several times as large as in the typical form and of a different color and texture was collected on the Corcovado by Schwacke (Mus. Nac. Rio Jan. 25885).

NOTES ON BOUCHETIA

The Texas plant known for many years as *Bouchetia erecta* DC. has more recently been known as *Bouchetia anomala* (Miers) Britt. & Rusby, based on *Nierembergia anomala* Miers.[8] Miers based his species primarily on plants collected by himself in the province of Córdoba, Argentina, but included also in his concept a specimen collected at San Felipe, Texas (*Drummond* III 245). Later in the same year Sendtner [9] described the same species from Argentina as *N. staticifolia* Sendtn. In a supplement to his treatment [10] he recognized the identity of his species with that of Miers, but stated that Miers had confused two species and that the plant of Texas should be called *N. miersiana* Sendtn. He provided no description of the Texas species, his name thus being a *nomen nudum*.

Bouchetia erecta DC. was described subsequently and independently,[11] based on Mexican collections. *Bouchetia erecta* and *B. anomala* have usually been considered identical, but a study of the two has convinced me that there are two entities involved. Despite its name "*erecta*," the plant of Texas and Mexico is not erect but is decumbent, with slender, rather short, ascending branches. *B. anomala* is more robust, taller, and commonly erect. The really important difference between the two is, however, the pubescence, not in the quantity but in the type. *B. erecta* is sometimes rather densely but usually sparingly puberulous with short, incurved, eglandular hairs on the stems and leaves; *B. anomala* is, on the upper leaves and stems, densely glandular-hirtellous, the hairs being stiff, spreading at right angles and not at all incurved, and tipped by a conspicuous capitate gland. Considering the great geographic isolation of these two forms, it seems reasonable to consider them as representing distinct species. The synonymy may be summarized as follows:

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[8] Lond. Journ. Bot. **5**: 175. 1846.

[9] In Mart. Fl. Bras. **10**: 179. 1846.

[10] Op. cit. 200.

[11] DC. Prodr. **13**[1]: 589. 1852.

Bouchetia anomala (Miers) Britt. & Rusby, Trans. N. Y. Acad. **7**: 12. 1887.
Nierembergia anomala Miers, Lond. Journ. Bot. **5**: 175. 1846.
Nicotiana breviflora Gill. ex Miers, loc. cit. in syn.
Nierembergia staticifolia Sendt. in Mart. Fl. Bras. **10**: 179. 1846.
RANGE: Uruguay, Argentina (Prov. Córdoba, Tucumán, Misiones, Formosa), and Chile(?).

Bouchetia erecta DC. Prodr. **13**[1]: 589. 1852.
Nierembergia miersiana Sendtn. in Mart. Fl. Bras. **10**: 200. 1846 (*nomen nudum*)
Nierembergia anomala var. *uniflora* Dunal in DC. Prodr. **13**[1]: 588. 1852.
Leucanthea roemeriana Scheele, Linnaea **25**: 258. 1852.
RANGE: Central and southern Texas and Mexico (Puebla, Michoacán, San Luis Potosí, Hidalgo, Nuevo León, Coahuila).

An additional synonym of *Bouchetia anomala* is probably *Nierembergia graveolens* var. *grandifolia* Kuntze,[12] the type of which came from Jujuy, Argentina. In the recent revision of *Nierembergia* by R. Millan [13] this variety is placed as a synonym of *N. browallioides* Griseb. However, there is no indication that Millan saw any authentic material. An isotype in the National Herbarium is unquestionably *Bouchetia anomala*. Nevertheless, it is possible that Kuntze's plants were a mixture of two species.

A LIST OF URUGUAYAN PETUNIAS, WITH ONE NEW SPECIES

Through the kindness of Señor Diego Legrand I have been able to study a good collection of Uruguay petunias. The species of *Petunia* are fairly well understood now, as a result of the excellent monograph by Dr. R. E. Fries. The following species are known to occur in Uruguay: *P. thymifolia* (St. Hil.) Sendtn., *P. humilis* R. E. Fries, *P. felipponei* Sandw., *P. pubescens* (Spreng.) R. E. Fries, *P. axillaris* (Lam.) Britt. & Rusby, *P. pygmaea* R. E. Fries, *P. parviflora* Juss. and *P. violacea* Lindl. The collection above mentioned contained one new species, described herewith.

Petunia scabridula Morton, sp. nov.

Fruticulus parvus, basi valde ramosus, ramulis ubique scabridulis; folia inferiora fasciculata, superiora alterna vel suprema subopposita, laminis ovato-lanceolatis, parvis, basi amplexicaulibus, utrinque scabridulis, nervis obscuris; pedicelli graciles; calyx externe glanduloso-hirtellus, lobis ovato-lanceolatis; corolla rosea, infundibuliformis.

Eupetunia; small shrub 12–18 cm. high, much-branched expecially at base, the branchlets terete, about 1 mm. in diameter, scabridulous, the hairs hyaline, very short, articulate, patent, capitate-glandular at apex; leaves alternate (the uppermost subopposite, the lower fasciculate), ovate-lanceolate, 2–5 mm. long, 1–2 mm. wide, acute, not at all attenuate at base, amplexicaul, thick, scabridulous on both sides (the hairs similar to those of the branchlets), the margin plane, the nerves obscure; inflorescence of the usual type for the genus, the pedicels slender, up to 15 mm. long; calyx 7–8 mm. long (in flower), glandular-hirtellous externally, the tube about 4 mm. long, the lobes ovate-lanceolate, 3–4 mm. long; corolla rose, infundibuliform, about 17 mm. long, sparsely glandular-pilosulous externally, the limb about 2 cm. broad; stamens 5, all fertile, equal, the filaments affixed

[12] Rev. Gen. Pl. **3**[2]: 223. 1898.
[13] Darwiniana **5**: 487–547. 1941.

to the base of the corolla tube, glabrous; style slender, glabrous; stigma capitate, not at all bilobed; seeds minute, subreniform, scarcely 0.75 mm. long.

Type in the U. S. National Herbarium, No. 1,441,438, collected at Mosquitos, Department of Canelones, Uruguay, November 2, 1928, by C. Osten (No. 20060).

Of the Uruguayan species of *Petunia*, *P. scabridula* is most closely related to *P. humilis*, *P. thymifolia*, and *P. pubescens;* but these all have spatulate leaves, attenuate to the base, rather than broadened at base and amplexicaul as in *P. scabridula*. The very harsh, scabrous pubescence in the new species is also distinctive, as are the dwarf habit, woody, intricately branched stems, and the minute, closely fascicled lower leaves.

THE GENUS HYBANTHUS IN CONTINENTAL NORTH AMERICA

In 1930 I prepared a tentative treatment of the North American species of *Hybanthus* (Violaceae), but publication was delayed, because the types of several of the older species were not available for study. Since that time G. K. Schulze has published a paper [14] on the genus, but this deals almost entirely with the South American species, the only North American herbaceous species mentioned being the three that grow also in South America.

It thus seems worth while to offer the present preliminary synopsis, even though four of the older species still can not be placed and notwithstanding the fact that some of the names here adopted may be displaced when the types of these older species are studied. The only recent treatment of the North American species is by Philip Dowell.[15] This work is, however, inaccurate and inadequate in several respects. Seven species are described as new, but no mention at all is made of eight older species described from Mexico or Central America. The key is scarcely usable, because of emphasis on alternate or opposite leaves, a character of doubtful value in this genus. Four of the six species placed in the opposite-leaved group either always or usually have alternate leaves. Many of the other key distinctions used by Dowell are equally unreliable, being mostly variable leaf and stipule characters.

HISTORY OF THE GENUS

The first description of any species of this group is found in the "Iter Hispanicum" of Peter Loefling published in 1758, in which a new genus *Calceolaria* is proposed. Three species are described but not given specific names according to the Linnaean binomial system of nomenclature. These are: 1, *Calceolaria caule simplici hirsuto*, etc.; 2, *Calceolaria caule suffruticoso brachiato*, etc.; and 3, *Calceolaria frutescens*, etc.

[14] Morphologisch-systematische über die Gattung Hybanthus, Bot. Jahrb. Engler **67:** 437–492. 1936.

[15] North American Species of Calceolaria, Bull. Torrey Club **33:** 547–556. 1906.

In 1760 Jacquin [16] published the genus *Hybanthus* based on *H. havanensis* Jacq. In 1763 Linnaeus [17] reduced both *Calceolaria* and *Hybanthus* to *Viola*. Loefling's species No. 1 became *Viola calceolaria* L.; No. 2, *Viola oppositifolia* L.; and No. 3 was combined with *Hybanthus* Jacq. and called *Viola Hybanthus* L. Later the name *Calceolaria* was applied to a genus of Scrophulariaceae. The Vienna Congress of 1905 conserved the name *Hybanthus* Jacq. for the genus of Violaceae, rejecting *Calceolaria* Loefl.

After Linnaeus, no more species of *Hybanthus* from continental North America were described until 1797, when Ortega published *Viola verticillata*, which was shortly thereafter raised to generic rank as *Solea* Spreng.[18] *Ionidium* Vent.[19] was based on a new species, *I. polygalifolium*, soon found to be synonymous with *Solea verticillata*. Nevertheless, *Ionidium* obtained wide recognition, almost up to the present time.[20]

In his monograph [21] of the Violaceae, Gingins recognized four genera of this alliance: *Pombalia* Vand., *Pigea* DC., *Ionidium* Vent., and *Hybanthus* Jacq. These have been considered congeneric by most recent authors. However, it is possible that a monographic study of all the species might show that several genera can be recognized with propriety.

THE UNITED STATES SPECIES

There are only three species native to the United States, one of which is common in the Southwest, and one widespread in the Eastern States (*H. concolor*, commonly known as "green violet"). The latter has often been maintained as a distinct genus, *Cubelium*, but it can not be separated from *Hybanthus*, unless that genus be split up into a number of small genera. It is to be noted also that *Cubelium* Raf. is a *nomen nudum*.

KEY TO SPECIES

Glands of the two lower filaments connate into a single large gland_ **1. H. concolor**
Glands of the two lower filaments distinct.
  Flowers only slightly zygomorphic, the labellum little longer than the other petals; connectives of the two lower anthers glabrous__ **2. H. verticillatus**
  Flowers strongly zygomorphic, the labellum twice as long as the other petals, or more; connectives of the two lower anthers hairy___ **3. H. attenuatus**

1. Hybanthus concolor (Forst.) Spreng. Syst. Veg. **1**: 805. 1825.
Viola stricta Muhl. Trans. Amer. Phil. Soc. **3**: 178. 1793 (*nomen nudum*).
Viola concolor Forst. Trans. Linn. Soc. Bot. **6**: 309. *pl. 28*. 1802.
Solea stricta Spreng. Pl. Pugill. **1**: 22. 1813, not *S. stricta* Spreng. Syst. Veg. **1**: 803. 1825.
Ionidium sprengelianum Roem. & Schult. Syst. Veg. **5**: 401. 1819.

[16] Enum. Pl. Carib. 17. 1760.
[17] Sp. Pl. Ed. 2. 1327. 1763.
[18] Journ. Bot. Schrad. **1800** [2]: 192. 1801.
[19] Jard. Malm. *pl. 27*. 1803.
[20] E. g., Britt. & Wils. Sci. Surv. Porto Rico **5**: 597. 1924.
[21] DC. Prodr. **1**: 287–316. 1824.

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Viola sprengeliana Steud. Nom. Bot. 887. 1821.
Cubelium concolor Raf. Cat. Bot. Gard. Trans. Univ. 13. 1824.
Noisettia acuminata DC. Prodr. **1**: 290. 1824. Type: "In Amer. bor."
Solea concolor Ging. in DC. Prodr. **1**: 306. 1824.
Ionidium concolor S. Wats. Bibl. Ind. 81. 1878.
Calceolaria concolor Kuntze, Rev. Gen. Pl. **1**: 41. 1891.
RANGE: Southern Canada and Eastern United States south to the Gulf of Mexico and west to Michigan, Kansas, and Mississippi.

2. Hybanthus verticillatus (Ortega) Baill. Hist. Pl. **4**: 345. 1873.
Viola verticillata Ortega, Hort. Matr. Dec. **4**: 50. 1797.
Solea verticillata Spreng. Journ. Bot. Schrad. **1800** [2]: 192. 1801.
Ionidium polygalifolium Vent. Jard. Malm. *pl. 27*. 1803. Type: Cultivated plant.
Viola polygalifolia Poir. in Lam. Encycl. **8**: 648. 1808.
Ionidium verticillatum Roem. & Schult. Syst. Veg. **5**: 399. 1819.
Ionidium gracile Moc. & Sessé ex Ging. in DC. Prodr. **1**: 309. 1824. Type: Mexico, *Mociño & Sessé.*
Ionidium lineare Torr. Ann. Lyc. N. Y. **2**: 168. 1828. Type: On Red River, Ark., *James.*
Ionidium stipulaceum Nutt. ex Torr. & Gray, Fl. N. Amer. **1**: 144. 1838. Type from plains of Red River, Ark., *Nuttall.*
Ionidium lineare var. *platyphyllum* A. Gray, Pl. Wright. **1**: 12. 1850. Type from Valley of Limpia, Tex., *Wright.*
Calceolaria gracilis Kuntze, Rev. Gen. Pl. **1**: 41. 1891.
Calceolaria linearis Kuntze, loc. cit.
Calceolaria verticillata Kuntze, loc. cit.
Hybanthus verticillatus var. *platyphyllus* Cory, Bull. Texas Agr. Exp. Sta. **550**: 73. 1938.
RANGE: Kansas, Oklahoma, Colorado, Texas, New Mexico, Arizona, and throughout the Mexican Plateau.

The species is well known and the specimens are so numerous that I do not cite them. This, the commonest North American species of the genus, is remarkably variable in the shape of the leaves, which may be linear, oblong, oblanceolate, or even obovate. The indument varies from villous to puberulous, but some plants are nearly glabrous. Most plants have entire leaves, but a form with toothed leaves is occasionally found (var. *platyphyllus*).

I am indebted to Dr. L. B. Smith for pointing out that the citation for the publication of the combination *Hybanthus verticillatus* given in the Index Kewensis (namely, Baill. Bot. Med. **2**: 841. 1884) is not the earliest. American authors have wrongly ascribed it to A. Nels. (in Coult. & Nels. Man. Bot. Rocky Mts. 323. 1909).

3. Hybanthus attenuatus (H. & B.) G. K. Schulze, Notizbl. Bot. Gart. Berlin **12**: 114. 1934.
Ionidium attenuatum H. & B. ex Roem. & Schult. Syst. Veg. **5**: 402. 1819.
Ionidium riparium H. B. K. Nov. Gen. & Sp. **5**: 378. 1821 (*nom. abort.*).
Viola calceolaria Moc. & Sessé ex Ging. in DC. Prodr. **1**: 311. 1824, in syn., non L. (1763).
Ionidium calceolarium Ging. in DC. Prodr. **1**: 311. 1824. Type: Mexico, *Mociño & Sessé.*
Ionidium parietariifolium DC. Prodr. **1**: 308. 1824. Type from Veracruz and Peru.
Ionidium parietariifolium var. *Houstonii* DC. loc. cit.
Solea parietariifolia Spreng. Syst. Veg. **1**: 803. 1825.
Solea riparia Spreng. op. cit. 804.

Ionidium riparium var. *aestivum* Gray, Pl. Wright **2**: 16. 1852. Type from Sonora, *Wright* 859.
Calceolaria mocinoana Kuntze, Rev. Gen. Pl. **1**: 41. 1891. (New name for *I. calceolaria* Ging.)
Calceolaria riparia Kuntze, loc. cit.
Hybanthus parietariifolius Loes. Bull. Herb. Boiss. II: **3**: 214. 1903.
Calceolaria riparia var. *houstonii* Dowell, Bull. Torrey Club **33**: 554. 1906.
Hybanthus riparius Standl. in Standl. & Cald. List. Prel. Pl. Salvador 152. 1925.
Mercurialis glabra M. E. Jones, Contr. West. Bot. **18**: preprint 68. 1933. Type from Guadalajara, Mexico, *M. E. Jones*.

RANGE: Arizona to South America.

SPECIMENS EXAMINED (selected):

ARIZONA: *Goodding* 985; *Harrison* 9172; *Kearney & Peebles* 10417, 10592. CHIHUAHUA: *Palmer* 25, 93. SONORA: *Wright* 859. SINALOA: *Rose* 1831. NAYARIT: *Palmer* 1826; *Ferris* 5715. COLIMA: *Palmer* 86. JALISCO: *Rose & Painter* 7642. MORELOS: *Pringle* 6391. MICHOACÁN: *Arsène* 2851. GUERRERO: *Rusby* 151. MEXICO: *Hinton* 4341. PUEBLA: *Purpus* 3416. VERACRUZ: *Bourgeau* 2661. YUCATÁN: *Gaumer* 791. GUATEMALA: *Seler* 2557; *Donnell Smith* 1983; *Bernoulli* 68; *von Tuerckheim* II. 1248. HONDURAS: *Standley* 54070. EL SALVADOR: *Standley* 22004, 22368. NICARAGUA: *Maxon, Harvey, & Valentine* 7126. COSTA RICA: *Pittier* 2189, 8778; *Tonduz* 13822. PANAMA: *Pittier* 2755, 3561; *Standley* 27035, 27980.

THE MEXICAN HERBACEOUS SPECIES

I recognize here 12 herbaceous species from Mexico. There are four others listed at the end as dubious. There are only three woody species known from Mexico, two of which were treated by Standley in the "Trees and Shrubs of Mexico," viz., *H. yucatanensis* Millsp. (Yucatan) and *H. mexicanus* Ging. (San Luis Potosí). The third species is *H. salacioides* G. K. Schulze, described from Veracruz.

KEY TO SPECIES

Labellum not much longer than the other petals, short-clawed; connectives of the two lower anthers glabrous.
  Leaves sessile, narrow, thick; stipules often foliaceous; flowers solitary. **1. H. verticillatus**
  Leaves petiolate, usually broader, thin; stipules very small; flowers often pseudo-racemose.
    Leaves closely and finely serrulate **2. H. serrulatus**
    Leaves coarsely serrate to subentire **3. H. fruticulosus**
Labellum twice as long as the other petals, or more; connective of the two lower anthers at least slightly hairy.
  Plants annual **4. H. attenuatus**
  Plants perennial.
    Leaves lanceolate to linear-lanceolate **5. H. oppositifolius**
    Leaves broader.
      Leaves rounded at base **6. H. occultus**
      Leaves cuneate at base.
        Lip of corolla villous **7. H. potosinus**
        Lip glabrous or minutely puberulous.
          Ovary and capsule hairy **8. H. longipes**

Ovary and capsule glabrous.
Capsule 8–12 mm. long, long-beaked.
Leaves acuminate, with numerous short, sharp teeth_ **9. H. elatus**
Leaves acute, with fewer, larger, blunter teeth_ **10. H. verbenaceus**
Capsule 5 mm. long or less, scarcely beaked.
Leaves glabrous; stems pubescent in lines; pedicels short; corolla lip glabrous_____ **11. H. humilis**
Leaves puberulous beneath, sparsely pilose above; stems equally puberulous throughout; pedicels long; lip puberulous. **12. H. thiemei**

1. **Hybanthus verticillatus** (Ortega) Baill. Hist. Pl. **4**: 345. 1873. See page 76 for synonymy and range.

2. **Hybanthus serrulatus** Standl. Journ. Washington Acad. Sci. **17**: 312. 1927.
Known only from the type collection, *Langlassé* 558, from the Sierra Madre of Michoacán or Guerrero, Mexico.

3. **Hybanthus fruticulosus** (Benth.) I. M. Johnst. Proc. California Acad. IV **12**: 1097. 1924.
Ionidium fruticulosum Benth. Bot. Voy. Sulph. 7. *pl. 2.* 1844. Type from Cape San Lucas, Baja California, *Barclay.*
Ionidium fruticulosum var. *dentatum* A. Gray, Proc. Amer. Acad. **5**: 154. 1861.
Calceolaria fruticulosa Kuntze, Rev. Gen. Pl. **1**: 41. 1891.
Calceolaria fruticulosa subsp. *flavescens* Dowell, Bull. Torrey Club **33**: 551. 1906. Type from Guaymas, Sonora, *E. Palmer* 253.
Calceolaria tenuifolia Dowell, op. cit. 550. Type from San José del Cabo, Baja California, *T. S. Brandegee* 18.
Hybanthus fruticulosus var. *flavescens* I. M. Johnst. Proc. California Acad. IV. **12**: 1097. 1924.
Hybanthus tenuifolius Standl. Journ. Washington Acad. Sci. **17**: 168. 1927.
Hybanthus peninsularis M. E. Jones, Contr. West. Bot. **18**: preprint 59. 1933. Type from Cayuca Ranch, Baja California, *M. E. Jones* 27830.
RANGE: Baja California and Sonora.
SPECIMENS EXAMINED:
BAJA CALIFORNIA: *Brandegee* 17, 18; *Xantus* 4; *Purpus* 421; *Jones* 27830, 27832; Santa Margarita Island, *Brandegee* s. n. SONORA: *Palmer* 253, 258; *Johnston* 4297, 4366.
Specimens collected at different times in the year look very different. The early leaves are broad and coarsely toothed. *Hybanthus tenuifolius* and *H. peninsularis* were founded on specimens of this type. Later, these leaves drop off and are replaced by narrow, almost linear, subentire leaves. The Sonora specimens are var. *flavescens*, distinguished by having glabrous leaves.

4. **Hybanthus attenuatus** (H. & B.) G. K. Schulze, Notizbl. Bot. Gart. Berlin **12**: 114. 1934. See page 76 for synonymy and range.

5. **Hybanthus oppositifolius** (L.) Taub. in Engl. & Prantl, Pflanzenfam. **3**[6]: 333. 1895.
Viola oppositifolia L. Sp. Pl. ed. **2**, 1327. 1763.
Ionidium oppositifolium Roem. & Schult. Syst. Veg. **5**: 395. 1819.
Ionidium angustifolium H. B. K. Nov. Gen. & Sp. **5**: 377. 1821.
Ionidium longifolium Moc. & Sessé ex Ging. in DC. Prodr. **1**: 311. 1824. Type from Mexico, *Mociño & Sessé.*
Solea oppositifolia Spreng. Syst. Veg. **1**: 803. 1825.
Calceolaria longifolia Kuntze, Rev. Gen. Pl. **1**: 41. 1891.

Calceolaria oppositifolia Kuntze, loc. cit.
Hybanthus longifolius Melch. in Engl. & Prantl, Pflanzenfam. ed. 2, **21**: 359. 1925.
Hybanthus angustifolius Standl. Journ. Washington Acad. Sci. **17**: 168. 1927.
RANGE: Mexico, Guatemala, and South America.
SPECIMENS EXAMINED:
TAMAULIPAS: *Palmer* 469; *Runyon* 899. SAN LUIS POTOSÍ: *Rose & Hough* 4868; *Purpus* 5329; *Pringle* 5011; *Pennell* 17914. VERACRUZ: *Ervendburg* 210; *Purpus* 2353, 8552; *Orcutt* 5192. GUATEMALA: *von Tuerckheim* 3595.

The species called *H. oppositifolius* by Standley in the "Flora of Costa Rica" is *H. attenuatus*.

6. Hybanthus occultus (Polak.) Standl. Field Mus. Publ. Bot. **18**: 714. 1937.
Ionidium occultum Polak. Linnaea **41**: 548. 1877. Type from La Carpintera, Costa Rica, *Polakowsky* s. n.
Calceolaria occulta Kuntze, Rev. Gen. Pl. **1**: 41. 1891.
Calceolaria nigricans Dowell, Bull. Torrey Club **33**: 554. 1906. Type from San Pedro Sula, Honduras, *Thieme* 5127.
Ionidium nigricans Donn. Smith, Enum. Pl. Guat. **8**: 219. 1907.
Hybanthus nigricans Standl. Journ. Washington Acad. Sci. **17**: 169. 1927.
Hybanthus purpusii Standl. Field Mus. Publ. Bot. **8**: 141. 1930. Type from Zacuapan, Veracruz, *Purpus* 13012.
RANGE: Mexico to Costa Rica.
SPECIMENS EXAMINED:
VERACRUZ: *Purpus* 13012, 14087, 2008; *Liebmann* 638. GUATEMALA: *Johnson* 714. HONDURAS: *Thieme* 5127. COSTA RICA: *Pittier & Tonduz* 4383; *Pittier* 4160; *Kuntze* 2233; *Standley* 35501.

E. P. Killip very kindly compared the type of *I. occultum* at Berlin with *Purpus* 2008 and found that the two specimens agreed in essential characters.

7. Hybanthus potosinus Morton, sp. nov.

Herba perennis, erecta, vix ramosa; caules pilosi; folia alterna, stipulata, stipulis minimis, breviter petiolata; lamina elliptica, rotundata, basi obtusa, crenata, utrinque pilosa; flores solitarii, breviter pedicellati; calycis lobi ovati, pilosi; petala superiora parva; labellum longum, externe pilosum; filamenta brevissima, connectivis antherarum inferiorum sparse pilosis, appendiculis ovatis, acutis, antheras aequantibus; capsula glabra.

Perennial herb 15–30 cm. high, erect, scarcely branched; stems terete, pilose, the hairs hyaline, straight, long, widely spreading; leaves alternate, stipulate, the stipules minute, about 1.2 mm. long, subulate, membranaceous, pilose, persistent; petiole short, about 2 mm. long, pilose; leaf blades elliptic, the largest 2.2 cm. long and 1.4 cm. wide, rounded at apex, obtuse at base, crenate, pilose on both sides; flowers solitary, axillary, short-pedicellate, the pedicels up to 5 mm. long, pilose, articulate near the apex, bibracteolate; calyx lobes ovate, green, pilose, acute, more or less unequal, the two lower about 4 mm. long, the 3 upper about 3 mm. long; petals 5, unequal, the 2 upper oblong, about 2.5 mm. long and 1.5 mm. wide, truncate, triplinerved, the 2 lateral about 4 mm. long, the fifth (labellum) about 7 mm. long, unguiculate, the claw 3-nerved, bidentate above base, the blade orbicular, about 4 mm. wide, pilose externally; stamens 5, more or less connate, the filaments very short, the two lower glanduliferous, the connectives of the lower anthers sparsely pilose, the appendages membranaceous, ovate, acute, equaling the anthers; ovary glabrous; capsule green, 3-valved, about 5.5 mm. long, glabrous, acute at apex; seeds spherical, yellow, about 1.6 mm. in diameter.

Type in the U. S. National Herbarium, No. 463,705, collected at Minas de San Rafael, San Luis Potosí, Mexico, July 1911, by C. A. Purpus (No. 5050) Isotypes in the Gray Herbarium and the New York Botanical Garden.

7a. Hybanthus potosinus var. **pennellii** Morton, var. nov.

Differt a var. *typica* foliis acutioribus, calycis lobis acuminatis, et floribus plus minusve majoribus, labello ca. 10 mm. longo, 6 mm. lato.

Differs from the typical variety in its acutish leaves, acuminate calyx lobes, and somewhat larger flowers, the labellum being 10 mm. long and 6 mm. broad.

Type in the U. S. National Herbarium, No. 1,640,001, collected at Alamar, Pabillo, southeast of Galeana, Nuevo León, Mexico, July 2–3, 1934, by F. W. Pennell (No. 17231).

8. Hybanthus longipes (Dowell) Standl. Journ. Washington Acad. Sci. **17**: 168. 1927.

Calceolaria longipes Dowell, Bull. Torrey Club **33**: 551. *pl. 19.* 1906. Type from between San Richardo and Ocozucuantla, Chiapas, Mexico, *Nelson* 2961.

RANGE: Known only from the type.

9. Hybanthus elatus (Turcz.) Morton, comb. nov.

Ionidium elatum Turcz. Bull. Soc. Nat. Moscou **36**[1]: 556. 1863. Type from Mexico, *Ghiesbreght* 47.

Calceolaria elata Kuntze, Rev. Gen. Pl. **1**: 41. 1891.

Calceolaria brevis Dowell, Bull. Torrey Club **33**: 552. 1906. Type from Jumaytepeque, Guatemala, *Heyde & Lux* 3943.

Calceolaria glabra Dowell, loc. cit. Type from Jalapa, Veracruz, *L. C. Smith* 1840.

Ionidium breve Donn. Smith, Enum. Pl. Guat. **8**: 219. 1907.

Hybanthus brevis Standl. in Standl. & Cald. List. Prel. Pl. Salvador 152. 1925.

Hybanthus glaber Standl. Journ. Washington Acad. Sci. **17**: 168. 1927.

RANGE: Mexico and Guatemala.

SPECIMENS EXAMINED:

VERACRUZ: *L. C. Smith* 1840; *Botteri* 895. OAXACA: *Conzatti & Cancino* 2432. GUATEMALA: *Heyde & Lux* 2943; *Heyde* 449; *von Tuerckheim* II. 1354.

Hybanthus glaber has somewhat larger leaves, more attenuate at each end, but does not seem specifically different.

10. Hybanthus verbenaceus (H. B. K.) Loes. Bull. Herb. Boiss. II. **3**: 215. 1903.

Ionidium verbenaceum H. B. K. Nov. Gen. et Sp. **5**: 379. *pl. 497.* 1821.

Solea verbenacea Spreng. Syst. Veg. **1**: 803. 1825.

Calceolaria verbenacea Kuntze, Rev. Gen. Pl. **1**: 41. 1891.

Calceolaria rosei Dowell, Bull. Torrey Club **33**: 555. 1906. Type from Guanajuato, *Rose & Hough* 4851.

Hybanthus rosei Standl. Journ. Washington Acad. Sci. **17**: 169. 1927.

Hybanthus pumilio Standl. Field Mus. Publ. Bot. **8**: 142. 1930. Type from Esperanza, Puebla, *Purpus* 5604.

RANGE: Mexico and Guatemala.

SPECIMENS EXAMINED:

COAHUILA: *Palmer* 55; *Pennell* 17327. SAN LUIS POTOSÍ: *Palmer* 219. GUANAJUATO: *Rose & Hough* 4851. PUEBLA: *Arsène* 1119, 5213; *Purpus* 3412, 3413, 5604. OAXACA: *Liebmann* 637; *Galeotti* 4500. CHIAPAS: *Ghiesbreght* 660. GUATEMALA: *Skutch* 472.

E. P. Killip compared *H. rosei* with the type of *H. verbenaceus* at Berlin and pronounced them the same. The greater or lesser development of the stipules stressed by Dowell is not of importance.

11. Hybanthus humilis (Rose & Dowell) Standl. Journ. Washington Acad. Sci. **17**: 169. 1927.

Calceolaria humilis Rose & Dowell, Contr. U. 'SNat. Herb. **10**: 125. *pl. 42.* 1906. Type from Tizapan, Federal District, Mexico, *Pringle* 9653.

RANGE: Known only from the type collection.

12. Hybanthus thiemei (Donn. Smith) Morton, comb. nov.

Ionidium thiemei Donn. Smith, Bot. Gaz. **40**: 1. 1905. Type from San Pedro Sula, Honduras, *Thieme* 5628.

RANGE: Southern Mexico to El Salvador.

SPECIMENS EXAMINED:

CAMPECHE: *Lundell* 937. GUATEMALA: *Cook & Martin* 198. HONDURAS: *Thieme* 5628. EL SALVADOR: *Standley* 19729, 21190, 22294. PANAMA: *Alston & Allen* 1859.

DOUBTFUL SPECIES

IONIDIUM BOTTERII Turcz. Bull. Soc. Nat. Moscou **36**[1]: 556. 1863.

Calceolaria botterii Kuntze, Rev. Gen. Pl. **1**: 41. 1891.

Type from Orizaba, Veracruz, *Botteri* s. n.

IONIDIUM GALEOTTII Turcz. Bull. Soc. Nat. Moscou **27**[2]: 339. 1854.

Calceolaria galeottii Kuntze, Rev. Gen. Pl. **1**: 41. 1891. Type from Jalapa, Veracruz, *Galeotti* 7085.

IONIDIUM LASIOCARPUM Presl, Rel. Haenk. **2**: 96. 1831.

Calceolaria lasiocarpa Kuntze, Rev. Gen. Pl. **1**: 41. 1891.

Described from western Mexico from a collection by Haenke. It is, from description, probably the same as *H. serrulatus*, but I hesitate to make a new combination without seeing authentic material.

IONIDIUM LOBELIOIDES Schlecht. Linnaea **12**: 203. 1838.

Calceolaria lobelioides Kuntze, Rev. Gen. Pl. **1**: 41. 1891.

Type from Oaxaca, *Muhlenpfordt* s. n.

THE CENTRAL AMERICAN SPECIES

There are 11 species in Central America, four of which (*H. prunifolius, H. yucatanensis, H. costaricensis,* and *H. guanacastensis*) are woody. The remaining (herbaceous) species are mostly the same as those of Mexico. The recently proposed genus *Orthion* seems well founded and includes two species originally described as *Hybanthus.*

KEY TO SPECIES

Two lower filaments with a long, slender, recurved, pubescent spur. Large shrubs, with flowers over 3 cm. long ..... **1. H. prunifolius**

Two lower filaments not spurred.

Filaments long and slender, free. Ovary densely pubescent; corolla lip over 2 cm. long, calyx lobes toothed; perennial herbs with densely villous leaves. **2. H. calceolaria**

Filaments shorter and stouter, at least partly connate.

Glands of the two lower filaments connate into a single large gland; flowers in cymes ..... **3. H. yucatanensis**

Glands of the two lower filaments distinct.

Flowers only slightly zygomorphic, the labellum little longer than the other petals.

Leaves up to 1.3 cm. long; flowers about 3 mm. long. **4. H. costaricensis**

Leaves 4–10 cm. long; flowers about 6 mm. long. **5. H. guanacastensis**

Flowers strongly zygomorphic, the labellum much exceeding the other petals..... **H. attenuatus, H. oppositifolius, H. occultus, H. elatus, H. verbenaceus,** and **H. thiemei,** as distinguished above in key to Mexican species.

1. Hybanthus prunifolius (H. & B.) G. K. Schulze, Notizbl. Bot. Gart. Berlin **12**: 114. 1934.

Viola prunifolia H. & B. ex Roem. & Schult. Syst. Veg. **5**: 391. 1819.
Ionidium anomalum H. B. K. Nov. Gen. et Sp. **5**: 381. 1821.
Solea anomala Spreng. Syst. Veg. **1**: 804. 1825.
Calceolaria anomala Kuntze, Rev. Gen. Pl. **1**: 41. 1891.
Hybanthus anomalus Melch. in Engl. & Prantl. Pflanzenfam. ed. 2, **21**: 359. 1925.

RANGE: Costa Rica to northern South America.

SPECIMENS EXAMINED:

COSTA RICA: *Tonduz* (Donn. Sm. 7234; Herb. Nat. C. R. 10038), (Donn. Sm. 7235; Herb. Nat. C. R. 10065). PANAMA: *Hayes* 33; *Standley* 27462, 31261, 31317, 40795; *Williams* 780, 781; *Pittier* 6530.

2. Hybanthus calceolaria (L.) G. K. Schulze, Notizbl. Bot. Gart. Berlin **12**: 114. 1934.

RANGE: British Honduras and South America.

SPECIMENS EXAMINED:

BRITISH HONDURAS: *Lundell* 4230.

For synonymy see Schulze in Bot. Jahrb. Engler **67**: 461. 1936. This species is common and widespread in South America. The plant of British Honduras may conceivably be an introduction.

3. Hybanthus yucatanensis Millsp. Field Mus. Publ. Bot. **1**: 404. 1898.

Hybanthus cymosus Bartl. Proc. Amer. Acad. **43**: 56. 1907. Type from Gualan, Guatemala, *Deam* 385.

Type from Yucatán, *Gaumer* 469.

RANGE: Yucatán, Campeche, and Guatemala.

SPECIMENS EXAMINED:

GUATEMALA: *Deam* 385; *Blake* 7685; *Cook & Martin* 127.

4. Hybanthus costaricensis Melch. in Engl. & Prantl, Pflanzenfam. ed. 2, **21**: 359. 1925 (*nomen subnudum*); G. K. Schulze, Bot. Jahrb. Engler **67**: 450. 1936.

Type from Tablazo, Costa Rica, *Brade* 2526.

5. Hybanthus guanacastensis Standl. Journ. Washington Acad. Sci. **17**: 168. 1927.

Type from Los Ayotes, Costa Rica, *Standley & Valerio* 45423.

SPECIMENS EXAMINED:

COSTA RICA: *Standley & Valerio* 45423, 45346, 46161, 46197.

THE MEXICAN HERBACEOUS SPECIES OF AESCHYNOMENE

In "Trees and Shrubs of Mexico," Standley lists 17 species of *Aeschynomene* (Leguminosae), some of which are often herbaceous. The few additional species of the genus occurring in Mexico are treated below. In addition to these, the following species, of which I have seen no specimens, remain to be placed: *Aeschynomene bracteolans* Riley, *A. chiapensis* T. S. Brandeg., *A. mimosoides* C. & S., and *A. versicolor* Wend.

KEY TO SPECIES

Plants erect, virgate, sparingly appressed-puberulous; leaflets minute, numerous, linear-oblong----------**1. A. pinetorum**
Plants prostrate, usually viscid-pubescent; leaflets few, broadly oblong to obovate.
  Legume long-stipitate, the stipe 3–4 times as long as calyx; pod appressed-puberulous----------**2. A. falcata**
  Legume short-stipitate, the stipe equaling or only twice as long as calyx.
    Pod densely viscid-pubescent----------**3. A. viscidula**
    Pod glabrous or slightly hispidulous.
      Pod glabrous.
        Leaflets strongly reticulate-veined beneath, strongly ciliate; plant branched at base only----------**4. A. picachensis**
        Leaflets more inconspicuously reticulate, not ciliate; plant diffusely branched----------**5. A. acapulcensis**
      Pod hispidulous----------**6. A. brasiliana**

1. **Aeschynomene falcata** (Poir.) DC. Prodr. **2**: 322. 1825.
Hedysarum falcatum Poir. in Lam. Encycl. **6**: 448. 1804.
Aeschynomene elegans Cham. & Schlecht. Linnaea **5**: 583. 1830.
Aeschynomene falcata var. *elegans* Kuntze, Rev. Gen. Pl. **1**: 158. 1891.
Aeschynomene arenicola T. S. Brandeg. Univ. California Publ. Bot. **10**: 408. 1924.

The form occurring in Veracruz and Chiapas is var. *plurijuga* Benth., of which var. *elegans* is a synonym.

2. **Aeschynomene pinetorum** T. S. Brandeg. Univ. California Publ. Bot. **10**: 408. 1924.

The type is *C. A. Purpus* 9064, from Hacienda Montserrate, Chiapas, Mexico. The relationship of this species is with *A. paniculata* Willd., but the segments of the pod are larger and pubescent, and they are not suborbicular, but semiorbicular This may be the same as *A. hedysaroides* Mart. & Gal., the original description of. which is inadequate.

ADDITIONAL RECORDS:

MEXICO: Sierra de Tonala, Chiapas, *Purpus* 6635. Santa Efigenía, Oaxaca, *Nelson* 2851. San Juan Guichicovi, Oaxaca, *Nelson* 2735. Between Guichicovi and Lagunas, Oaxaca, *Nelson* 2751.

3. **Aeschynomene viscidula** Michx. Fl. Bor. Amer. **2**: 75. 1803.
Secula viscidula Small, Fl. Miami 90, 200. 1913.

This species, which is rather common in the United States along the Gulf coast from Florida to Texas, has occasionally been reported from tropical America. All specimens I have seen that have been so named are misidentified, except one. This is *Pringle* 5627, from hills near Oaxaca City, Mexico. I have only seen a fragmentary specimen of this collection, but it appears indistinguishable from the United States plants.

4. **Aeschynomene picachensis** T. S. Brandeg. Univ. California Publ. Bot. **6**: 181. 1915.
Type from Cerro de Picacho, Oaxaca, Mexico, July 1914, *C. A. Purpus* 7162.
RANGE: Known only from the type collection.

5. **Aeschynomene acapulcensis** Rose, Contr. U. S. Nat. Herb. **5**: 191. 1899.
Type from Acapulco, Guerrero, Mexico, Oct. 1894–March 1895, *E. Palmer* 126.
RANGE: Known only from the type collection.

6. Aeschynomene brasiliana (Poir). DC. Prodr. **2**: 322. 1825.
Cassia biflora Mill. Gard. Dict. ed. 8, No. 14. 1768, non L. (1753).
Hedysarum brasilianum Poir. in Lam. Encycl. **6**: 448. 1804.
Cassia houstoniana Collad. Hist. Nat. Med. Cass. 132. 1816.
Aeschynomene biflora Fawc. & Rendle, Fl. Jamaica **4**: 27. 1920.

Fawcett and Rendle were in error in taking up the name *biflora* for this species, Miller's name being a later homonym of the well-known species *Cassia biflora* L. In the "Flora of Costa Rica" Standley has followed Fawcett and Rendle.

Although common in Central and South America, this species is rare in Mexico. I have seen only one specimen, *Orcutt* 6479, from Tonalita, Jalisco; it was erroneously determined as *A. viscidula*.

NOTES ON OTHER SPECIES

Aeschynomene rosei Morton, nom. nov.
Aeschynomene fruticosa Rose, Contr. U. S. Nat. Herb. **5**: 192. 1899, non Moc. & Sessé (1889).

A well-marked species, still known only from the type collection from Topolobampo, Sinaloa. The identity of *A. fruticosa* Moc. & Sessé is uncertain.

Aeschynomene virginica (L.) B. S. P. Prel. Cat. N. Y. 13. 1888.
Hedysarum virginicum L. Sp. Pl. 750. 1753.
Aeschynomene hispida Willd. Sp. Pl. **3**: 1163. 1800.

In "Trees and Shrubs of Mexico," Standley has used the name *A. hispida* for this common species.

Aeschynomene ciliata Vogel, Linnaea **12**: 84. 1838.

This species, the type of which is from Brazil, has not been reported before from North America. There is in the National Herbarium a single specimen from Laguna de Curahueso, Tabasco, Mexico, collected April 8, 1889, by J. N. Rovirosa (No. 443). The relationship is with *A. virginica*, but *A. ciliata* may be distinguished by its strongly ciliate standard.

Aeschynomene rudis Benth. Pl. Hartw. 116. 1843.
Aeschynomene hispidula sensu Standley, Contr. U. S. Nat. Herb. **23**: 490. 1922, non H.B.K.

The true *A. hispidula* of Colombia, as shown by specimens compared with the type by E. P. Killip, is a quite different plant. It is a much-branched shrub or small tree to 20 feet, with densely glandular-pubescent branches. The loments are shorter and broader, with fewer, more coriaceous segments.

NOTES ON PHASEOLUS

The genus *Ramirezella* Rose [23] is recognized by Piper [24] in his treatment of American Phaseolineae on the basis of its keel being merely curved and not curled or coiled as in *Phaseolus*. This is, however, an arbitrary and often nonexistent distinction, for in many of the species the keel is curled in exactly the same way as in *Phaseolus*, section *Sigmoidotropis*. It is true that the bracts in *Ramirezella* are larger and more conspicuous than in the species of section *Sigmoidotropis*, but they are not more so than in some species of *Euphaseolus*. Two of the species have already been described as *Phaseolus*, namely

[23] Contr. U. S. Nat. Herb. **8**: 44. 1903.
[24] Op. cit. **22**: 669. 1926.

Phaseolus buseri Micheli and *P. lozanii* Rose. The type species of *Ramirezella* is *R. strobilophora* (B. L. Rob.) Rose, which may be known as *Phaseolus strobilophorus.*[25] An additional valid species is *Phaseolus pubescens.*[26] The remaining four species of *Ramirezella* are highly critical.

Phaseolus esperanzae Seaton, Proc. Amer. Acad. **28**: 118. 1893.

Phaseolus floribundus Piper, Contr. U. S. Nat. Herb. **22**: 690. 1926.

The types of these two species are identical. Piper separated them on the basis of the bracts, those of *P. floribundus* being said to be 5 mm. long and those of *P. esperanzae* 2 mm. long. In the specimens they are of equal length, averaging about 4 mm., none being either as long as 5 mm. or as short as 2 mm.

Phaseolus amblyosepalus (Piper) Morton, comb. nov.

Alepidocalyx amblyosepalus Piper, Contr. U. S. Nat. Herb. **22**: 672. 1926.

The genus *Alepidocalyx* Piper differs from *Phaseolus* only in the absence of a bractlet at the base of the calyx. The three species referred to the genus by Piper are dissimilar in appearance and do not seem closely related except by this one character. It seems, therefore, that the genus is not tenable, being based on a single purely artificial character. The present species is apparently rare and has been known only from the type specimen collected somewhere in Durango by P. Ibaña García. Dr. Pennell has found it at El Salto, Durango, at an altitude from 2,570–2,800 meters (No. 18351). His specimen is almost identical with the type. *Alepidocalyx parvulus* (Greene) Piper becomes again *Phaseolus parvulus* Greene. *Alepidocalyx anisophyllus* Piper is somewhat dubious, so I do not transfer it to *Phaseolus.*

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[25] **Phaseolus strobilophorus** Morton, comb. nov., based on *Vigna strobilophora* B. L. Rob. Proc. Amer. Acad. **27**: 167. 1892.

[26] **Phaseolus pubescens** Morton, comb. nov., based on *Ramirezella pubescens* Rose, Contr. U. S. Nat. Herb. **8**: 45. 1903.

LIST OF NEW SPECIES AND VARIETIES

Alloplectus cristatus var. brevicalyx
Alloplectus cristatus var. crenatus
Alloplectus cucullatus
Alloplectus cucullatus var. substrigosus
Alloplectus dominger sis var. microphylla
Alloplectus guatemalensis
Besleria arborescens
Besleria attenuata
Besleria calantha
Besleria eriocalyx
Besleria florida
Besleria inaequalis
Besleria lasiantha
Besleria obtusa
Besleria oxyphylla
Besleria solanoides var. dentata
Besleria spissa
Besleria subcoriacea
Besleria subdecurrens
Besleria ventricosa
Columnea sanguinea var. trinitensis
Columnea scandens var. vincentina
Columnea subcordata
Columnea vinacea
Columnea viridis
Cremosperma demissum
Cremosperma monticola
Cremosperma parviflorum
Cremosperma rotundatum
Cremosperma serratum
Hybanthus potosinus
Hybanthus potosinus var. pennellii
Napeanthus bracteatus
Petunia scabridula
Solanum aquatile
Solanum callianthum
Solanum caucaense var. glabrescens
Solanum confusum
Solanum crispulum
Solanum dissimile
Solanum gracilescens
Solanum grandifolium
Solanum irregulare
Solanum monticola
Solanum orgyale
Solanum oxyphyllum
Solanum triplinervium

LIST OF NEW NAMES AND NEW COMBINATIONS

Aeschynomene rosei
Columnea fawcettii
Columnea harrisii
Columnea scandens var. aripoensis
Hybanthus elatus
Hybanthus thiemei
Phaseolus amblyosepalus
Phaseolus pubescens
Phaseolus strobilophorus
Solanum australe
Solanum caucaense
Solanum chrysothrix
Solanum coffeifolium
Solanum conspicuum
Solanum crassidens
Solanum cundinamarcae
Solanum dendritocothrix
Solanum hoehnei
Solanum holocalyx
Solanum hypomalacum
Solanum integrum
Solanum lehmannii
Solanum longidentatum
Solanum luxurians
Solanum magdalenense
Solanum meridionale
Solanum miquelii
Solanum ornatum
Solanum poeppigii
Solanum profunderugosum
Solanum quinquelobatum
Solanum saltense
Solanum semiconnatum
Solanum stellato-pubescens
Solanum tarmense
Solanum tinctum
Solanum ulei
Solanum urnigerum

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CONTRIBUTIONS

FROM THE

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VOLUME 29, PART 2

MEXICAN PHANEROGAMS DESCRIBED BY M. E. JONES

By C. V. MORTON

ASTERACEAE DESCRIBED FROM MEXICO AND THE SOUTHWESTERN UNITED STATES BY M. E. JONES, 1908–1935

By S. F. BLAKE

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PREFACE

The present number of the Contributions consists of two papers devoted mainly to a discussion of the Mexican flowering plants proposed as new by the late Marcus E. Jones. The first, by C. V. Morton, assistant curator of the National Herbarium, is entitled "Mexican Phanerogams Described by M. E. Jones," but does not include the Asteraceae; the second, by S. F. Blake, senior botanist, United States Department of Agriculture, is entitled "Asteraceae Described from Mexico and the Southwestern United States by M. E. Jones, 1908–1935," and deals with this family as represented in the somewhat wider area indicated. Type or isotype specimens of nearly all the species discussed have been examined by the authors or by special students of various groups. Altogether, 217 new genera, species, and varieties proposed by Jones are treated. Of these, 175 are reduced to synonymy; 61 species were originally placed in the wrong genus and 10 others in the wrong family. The critical appraisal of this type material was thus a highly important task, and one made difficult by a combination of unusual factors which are discussed by the authors, necessarily in some detail. The results of this careful investigation will prove of great value to botanists concerned with the flora of Mexico and of tropical America generally.

WILLIAM R. MAXON,
Curator, United States National Herbarium.

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MEXICAN PHANEROGAMS DESCRIBED BY M. E. JONES

By C. V. Morton

INTRODUCTION

Marcus Eugene Jones (1852–1934) was an eminent collector whose specimens, usually well prepared, have been of great usefulness in making known the flora of the western United States. Also, he published valuable notes and descriptions in many families of plants, particularly the Polygonaceae, Nyctaginaceae, and Liliaceae. He is well known also for his monograph of the difficult genus *Astragalus* of the Leguminosae. These studies were published chiefly by himself in a series entitled "Contributions to Western Botany," of which 18 numbers were issued.

Although Jones had made a trip to southern Mexico as early as 1892 and several shorter excursions to Chihuahua and Baja California, he did not seriously devote himself to the flora of Mexico until, at the age of 74, he began a series of collecting trips in 1926. Subsequently he described a large number of new species based chiefly on the material thus assembled. Some years ago, through the kindness of Prof. P. A. Munz, the National Herbarium received a set of these collections, which included isotypes of 28 of the new species. A casual examination showed that many of these were synonymous with earlier species, some of them being placed by Jones in the wrong genus or even in the wrong family, suggesting the possibility that in some cases the labels had become mixed, although this has proved not to be true. Jones' herbarium and library facilities were not wholly adequate for work on the Mexican flora, and his previous experience had scarcely qualified him for critical research on tropical or subtropical plants. It seems likely, moreover, that his eyesight was not very good at the time, for there is little evidence in his descriptions that careful dissections were made for any of his new species. Consequently, it is no surprise to find that his work on the Mexican flora is poor and, in fact one is forced to say, comparable in quality only to that of Léveillé on the flora of China.

Since most of Jones' new species are not identifiable from his descriptions and, as above intimated, his views as to relationship are often far wide of the mark, I undertook some time ago to make a critical study of his type specimens. I am under great obligation to Professor Munz for spending a good deal of time in searching these out—not an easy task, because of the irregularities in Jones' labeling of his specimens. Excluding Asteraceae, which are being treated separately by Dr. S. F. Blake, Jones published in his Contributions No. 15

and No. 18 three new genera, 132 new species, and 7 new varieties. Of these Dr. Munz managed to find the types of 1 new genus, 122 new species, and 5 varieties. The remaining types seem not to be in the Jones Herbarium at Pomona College. One new genus (*Nissoloides*) and three of the missing species (*Lysiloma cayucensis*, *Sida rajoides*, and *Cuphea watsonii*) are represented by isotypes in the National Herbarium. An isotype of *Sebastiana sarmentosa* is in the Gray Herbarium. The type of *Erythea brandegeei* var. *spiralis* is presumably at the University of California, but it has not been necessary to consult it, since Dr. Bailey has published on the identity of this variety. Dr. Munz informs me that in all probability no herbarium material of *Erythea loretensis* was collected.

Excluding the species just mentioned, there remained five species and one variety still unaccounted for. The curators at the following institutions kindly made a search of the herbaria in their charge in an effort to locate the missing types: California Academy of Sciences, Chicago Natural History Museum, Gray Herbarium of Harvard University, New York Botanical Garden, Academy of Natural Sciences of Philadelphia, Dudley Herbarium of Stanford University, University of California, and University of California at Los Angeles. Several isotypes of *Dalea blasiana* and *Callitriche mexicana* were thus discovered, but three species (*Tephrosia fruticosa*, *Mortonia aspera*, and *Wahlenbergia filipes*) and one variety (*Ipomoea acaponetensis* var. *perennis*) are still missing.

Since such a large percentage of the new species have been found to be synonymous, it seems worth while to present the following annotated list for the use of Mexican botanists and others interested in the flora of Mexico. Of the 150 novelties described by Jones and treated in this paper in the body of the text and in the footnotes, 31 are here maintained as valid in some category, as follows: One genus valid, 21 species definitely or tentatively accepted as valid, 1 species reduced to subspecific rank, 1 species reduced to varietal rank, 1 species reduced to formal rank, 1 varety raised to specific rank, and 5 varieties accepted as valid. Two genera and 112 species and varieties are reduced to synonymy. Five species and varieties are still doubtful. Of the new species described, 33 were originally placed in the wrong genus, and 10 others in the wrong family.

I have limited this paper to a discussion of the Mexican species published in Jones' Contributions No. 15 and No. 18. The earlier Contributions contain a few Mexican species. Some of these are mentioned in footnotes, which contain also comments on some of the new species described from the southwestern United States.

In addition to the new species, Jones published many notes on others. These should not be accepted at their face value without first checking in his herbarium the identifications of the various

species mentioned. This I have not attempted to do, inasmuch as most of the notes are relatively unimportant. Jones' observations on distribution should be accepted only with caution, also. He gives long lists of plants observed from train windows, even going so far as to identify a species of *Muhlenbergia* specifically, this incidentally one not known to occur in the region being traversed.

I am deeply indebted to the following collaborators, who have been kind enough to identify specimens or to contribute text for special groups: Dr. L. H. Bailey, Dr. Robert T. Clausen, Dr. Lincoln Constance, Dr. Carl Epling, Dr. F. Raymond Fosberg, Dr. R. C. Foster, Dr. Frederick J. Hermann, Dr. Ivan M. Johnston, E. C. Leonard, Dr. Mildred Mathias, Dr. Rogers McVaugh, Dr. Harold N. Moldenke, Dr. Philip A. Munz, Rev. Father Hugh T. O'Neill, Dr. Alice M. Ottley, Dr. Francis W. Pennell, Dr. Bernice G. Schubert, Dr. Henry K. Svenson, and Dr. Louis C. Wheeler.

ITINERARIES IN MEXICO, 1926–1930

Jones made four excursions to Mexico between 1926 and 1930, his collections of these years forming the principal basis of his proposed new species. He published running accounts of his activities on each of these trips, but as these are somewhat diffuse and not easy to use it appears desirable to present a precise statement of his itineraries. These have been drawn up principally from Jones' own accounts, but they include additional data from the labels of his specimens.

TRIP OF 1926[1]

Oct. 20. Claremont, Calif., to Nogales, Ariz.
25. Nogales to Querobabi, Sonora; Querobabi to Carbó, Sonora (erroneously spelled Queribabi by Jones).
26. Carbó to Hermosillo, Sonora.
Oct. 26–Nov. 1(?). Hermosillo, Sonora.
Nov. 2. Guaymas, Sonora.
4. Guaymas to Santa Rosalia, Baja California.
5. Santa Rosalia to Muleje, Baja California.
7(?). Muleje to Loreto, Baja California.
8. Loreto to La Paz, Baja California.
9–17. La Paz and vicinity, including Triunfo and San Antonio.
17. La Paz to Mazatlán, Sinaloa.
18–21. Mazatlán, Sinaloa.

TRIP OF 1927[2]

Jan. 23–24. Nogales, Ariz., to Guaymas, Sonora.
25–26. Guaymas.
27. Guaymas to San Blas, Sinaloa.

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[1] See Contr. **15**: 80–87. 1929, and op. cit. 96–110. According to Jones (op. cit. 76) his 1926 collection includes his numbers 22292 to 22834.

[2] Described by Jones, Contr. **15**: 87–92. 1929, and op. cit. 110–123. Jones states (op. cit. 76) that his 1927 collections are numbered 22835 to 23567.

Jan. 28–30. San Blas.
30. Los Mochis, Sinaloa.
Feb. 1–3. San Blas.
5. San Blas to Mazatlán, Sinaloa.
6–7. Mazatlán to Tepic, Nayarit.
8–16. Tepic.
17. Tepic to Ixtlán, Nayarit.
18–19. Ixtlán.
20. Ixtlán to La Barranca, Nayarit.[3]
21–23. La Barranca, Nayarit.
23. La Barranca to Tepic.
24–27. Acaponeta, Nayarit.
28. Acaponeta to El Tigre Mine, Nayarit.[4]
Mar. 1. El Tigre Mine to Acaponeta.[5]

TRIP OF 1928[6]

Jan. 12. San Pedro, Calif., to San José del Cabo, Baja California.
La Paz, Baja California.
Feb. 15–19. Todos Santos, Baja California.
21. Cota Ranch, near Todos Santos, Baja California.
27. La Paz to San Bártolo, Baja California.
Miraflores.
Mar. 2. Laguna Mountains.
La Paz.
La Paz to San Pedro, Calif.

TRIP OF 1930[7]

Sept. 14. San José del Cabo, Baja California.
19. Todos Santos, Baja California.
20. Todos Santos to Cota Ranch (20 miles toward the Laguna Mountains) and on to Borrego Ranch, altitude 1,700 feet.

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[3] Not to be confused with the well-known La Barranca near Guadalajara' Jalisco. Jones speaks (Contr. **15**: 90,118) of La Barranca, Nayarit, as an old ranch and construction camp at the [then] end of the railroad, 30 miles beyond Ixtlán, in extreme southern Nayarit. Dr. Blake finds a town called Barrancas in Nayarit on the railroad practically on the border of Jalisco, but it is only about a dozen miles east of Ixtlán (Atlas Geográfico de la República Mexicana, ed. 24. 1942). Jones later (Contr. **17**: 13) says that La Barranca is about 65 miles northwest of Guadalajara.

[4] According to Jones (Contr. **15**: 121) El Tigre Mine is "some 26 miles east of Acaponeta."

[5] On this date Jones was traveling on horseback from El Tigre Mine to Acaponeta. Some of the specimens collected are labeled "El Tigre Mine," some "Acaponeta," and others "El Tigre Mine, Acaponeta."

[6] This trip is described by Jones (Contr. **15**: 92–95. 1929), but not so fully as the others, the dates being mostly omitted. The itinerary as given above includes all dates on which specimens forming the basis of new species were collected. According to Jones (op. cit. 76) his 1928 collection includes numbers 24001 to 24659.

[7] See Contr. **18**: 86–119. 1935.

Sept. 21. Borrego Ranch to Pelota Ranch (6 miles distant), and on to The Laguna, at crest of Laguna Mountains, altitude 7,800 feet.
22–23. The Laguna.[8]
24. The Laguna to Pelota Ranch.
25. Pelota Ranch to Borrego Ranch.
26. Borrego Ranch to Todos Santos.
27. Beach at Todos Santos.
28. Todos Santos to La Paz.
30. Espíritu Santo Island and Pichilinque Island (erroneously spelled Pichilinga by Jones).
Oct. 2. Cacachilla Mountains, 20 miles south of La Paz.
3. Beach at La Paz.
6. Triunfo, about 35 miles south of La Paz, altitude 150 feet.
9. Pichilinque Island.
14–15. La Paz to Loreto, Baja California.
16–17. Mountains east of Loreto.
19–20. Primera Agua, 9 miles west of Loreto, in the foothills of the Sierra de la Giganta, altitude 400 feet (erroneously spelled Primiera by Jones).
20. Iuca Ranch, Sierra de la Giganta, altitude 800 feet.
22. Garizar Mill, Sierra de la Giganta, altitude 675 feet.
23. Cayuca Ranch, 3 miles above Garizar Mill, Sierra de la Giganta, altitude 1,000 meters.
26. Arroyo Undo, Sierra de la Giganta.[9]
27. Arroyo Undo to Cayuca Ranch and Salto Ranch.
28. Loreto.
Nov. 3–4. Loreto to Santa Rosalia, Baja California.
5. Santa Rosalia to Guaymas, Sonora.
8. Guaymas to Mazatlán, Sinaloa.
11–12. Mazatlán to Guadalajara, Jalisco.
13. La Barranca, near Guadalajara.[10]
14. Guadalajara.
16–21. La Barranca.
22. Guadalajara.
23. La Barranca.
24. Guadalajara.
25. La Barranca.
26–27. Guadalajara.
27–28. Orendain, Jalisco.[11]

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[8] The Laguna is a grassy plain at the crest of the Laguna Mountains. It is described in Contr. **18**: 93–94.

[9] Dr. Blake suggests that this is a misspelling of Arroyo Hondo. The Sierra de la Giganta is given throughout by Jones as "Sierra Giganta."

[10] Erroneously stated (Contr. **18**: 23) to be 5 miles southwest of Guadalajara. It is actually about this distance north and east. E. A. Goldman states that the Barranca is now called "Cañon de los Oblatos."

[11] Erroneously stated (Contr. **18**: 23) to be 20 miles northeast of Guadalajara. It is really this distance west-northwest.

SYSTEMATIC TREATMENT [12]

GRAMINEAE

Paspalum tenuissimum Jones, Contr. **18**: 24. 1935 (without Latin diagnosis).

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27584 (Pomona Coll. Herb.). There is a fragment of the type in the National Herbarium.

Mrs. Agnes Chase identifies this as MICROCHLOA KUNTHII Desv. (Opusc. 75. 1831), a rather common grass of the tribe Chlorideae, until recently better known as *Microchloa indica* (L. f.) Kuntze. This reduction has been made also by J. R. Swallen (N. Amer. Fl. **17**: 580. 1939).

CYPERACEAE [13]

Carex lagunensis Jones, Extracts from Contr. **18**: 26. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27592 (Pomona Coll. Herb. No. 193052).

This is a distinct species of the section *Ovales*, nearest allied to *Carex multicostata* Mack., from which it differs chiefly in its much shorter, scarcely bidentate perigynium beak. In habit it is very suggestive of *C. peucophila* Holm, but from that it differs in its more coriaceous, much more prominently winged perigynium, which is serrate to below the middle, and also in its very short perigynium beak. There is no relationship with *C. illota* Bailey, with which Jones compared it.

Carex longissima Jones, Extracts from Contr. **18**: 26. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27594 (Pomona Coll. Herb. No. 193612). A second specimen was collected at the same locality September 24, 1930 (*Jones* 27593).

This is a distinct species of the section *Filifoliae*, most nearly allied to *Carex arsenii* Kükenth., from which it differs in having the beak of the perigynium twice as long (1 mm.), the pistillate scales aristate, the spikes longer (up to 6 cm.), and the leaves narrower (mostly 0.5 mm. wide).

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[12] The only Mexican nonphanerogamic plant described by Jones is the following:

Selaginella barrancae Jones, Contr. **16**: 23. 1935 (without Latin diagnosis).

Type: La Barranca, Guadalajara, Jalisco, November 19, 1930, *Jones* s. n. (Pomona Coll. Herb. No. 192917). In the description the date is given as November 25, 1930, presumably in error, since there is no specimen of this species in the Jones Herbarium collected on that date. However, there is a *Selaginella* in the Jones Herbarium collected by Jones at La Barranca on November 25, 1930, which disagrees with the description of *S. barrancae*. It has been marked by Jones as the type of an unpublished species with a manuscript name meaning "white-marginate." It is *Selaginella reflexa* Underw. (Bull. Torrey Club **21**: 268. 1894), which was based on a Pringle collection from Guadalajara.

This is SELAGINELLA SCHAFFNERI Hieron. (in Engl. & Prantl, Pflanzenfam. **1**[4]: 674. 1901.

[13] Text of *Carex* contributed by Dr. Frederick J. Hermann, that of *Cyperus* by Rev. Father Hugh T. O'Neill, and that of *Fuirena* by Dr. Henry K. Svenson. Dr. Hermann supplies also the following note: "There is in the Jones herbarium another *Carex* marked as a new species by Jones with a manuscript name in honor of Mr. Diehl. This was collected at Meadow Valley, Sierra Madre Mountains, Chihuahua, September 17, 1903 (Pomona Coll. Herb. No. 81199). This evidently represents a distinct undescribed species of the section *Ovales*, nearest in perigynia to *Carex molesta* Mack., but these are more coriaceous and more narrowly winged, especially toward base. In habit, congested inflorescence and dark scales it is suggestive of *C. multicostata* Mack."

Cyperus barrancae Jones, Extracts from Contr. **18**: 25. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 23, 1930, *Jones* 27601a (Pomona Coll. Herb. No. 193107).

This is CYPERUS SURINAMENSIS Rottb. (Descr. Pl. 35. 1773).

Cyperus guadalajaranus Jones, Extracts from Contr. **18**: 25. 1933.

Type: Guadalajara, Jalisco, November 26, 1930, *Jones* 27603 (Pomona Coll. Herb. No. 193441).

This is CYPERUS AMABILIS Vahl var. MACROSTACHYUS (Boeckl.) Kükenth. (in Engl. Pflanzenreich **101**: 266. 1936).

Cyperus aristatus var. **perennis** Jones, Extracts from Contr. **18**: 25. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27595 (Pomona Coll. Herb. No. 192522). Isotype in the herbarium of the University of California.

This is **Cyperus perennis** (Jones) O'Neill, comb. nov. Its conspicuously thick, perennial base with a persistent coat of dense fibers resulting from the dead leaf sheaths, the small, very broadly cuneate achene (broader than long), and the 5-nerved glume readily distinguish this species from *C. aristatus* Rottb., which is an annual lacking both a thickened base and a persistent fibrous coat and having oblong-obovoid achenes and 7–9-nerved glumes. The position of *C. perennis* is in section *Dichostylis* (Beauv.) Baill. Its closest relative is the South American species *C. uncinulatus* Schrad., from which it may be distinguished by the following key:

Glumes 3-nerved, 1.5 mm. long, 0.6 mm. wide, valvate, gradually tapering to the mucro; achenes about 0.3 mm. long; spikelets 7–8 mm. long ..... **C. uncinulatus**

Glumes 5-nerved, 2 mm. long, 1 mm. wide, conspicuously imbricate, abruptly contracted into the mucro; achene about 0.5 mm. long; spikelets 4–5 mm. long ..... **C. perennis**

A more detailed description of the species follows:

Perennis, rhizomatibus brevibus lignosis, radicibus fibrosis; culmi caespitosi, vaginis mortuis fibrosis cincti, laeves, obtuse trigoni, multistriati, basi lignoso-incrassati; folia culmo 2–3–plo longiora, setacea usque ad 1 mm. lata, conduplicata, stricta vel arcuata, haud septato-nodulosa, marginibus et interdum costa infra minute serrulata, vaginis brunneis; bracteae 2–4, inaequales, foliis similes; anthela in caput unicum subglobosum contractum, 15–40 spiculatum, spiculis linearibus, compressis, 10–15–floris, rhachillis exalatis, marginibus cartilagineis, bracteolis ovatis, prophyllo ovato, apice acute bilobato, rhachilla cingente, glumis aristatis, recurvis, 5-costatis, tarde deciduis, aequalibus, viridi-carinatis; stamen 1, filamento plano; stylus trifidus; achaenium obtuse trigonum, turbinatum, apice truncatum et minute apiculatum, lateribus convexis, minute puncticulatis, purpureo-brunneum, basi non stipitatum.

Perennial. Rhizome short, ligneous. Roots fibrous (about 0.3 mm. thick), pubescent. Culms cespitose, included in mass of fibers resulting from the preceding year's leaf bases, 1.5–3.5 cm. high, 0.3–0.5 mm. thick, slender, smooth, obtusely trigonous, multistriate, not septate-nodulose, ligneous-thickened at base. Leaves 2 or 3 on a culm, longer than culm, 1.5–7.5 cm. long, setaceous to 1 mm. wide, subcoriaceous, conduplicate, erect or arcuate, not septate-nodulose, minutely serrulate on the margins and occasionally on the dorsal midrib, the sheaths brown. Bracts 2–4, unequal in length and width, 1–9 cm. long, otherwise like the leaves. Inflorescence a solitary subglobose head 1–1.2 cm. wide at summit of culm, consisting of 15–40 spikelets. Spikelets 4–6 mm. long, 1–1.2 mm. wide

(excluding the awns), about 0.3 mm. thick, linear, compressed, 10–15-flowered. Rhachilla 0.3 mm. wide, 0.1 mm. thick, straight, the edge produced as cartilaginous margins, the bracteole 1.2 mm. long (its awn an additional 1.2 mm. long), 1 mm. wide, ovate, the secondary prophyllum 1.2 mm. long, 0.8 mm. wide, with two acute lobes at apex, sheathing the rhachilla. Glumes 0.8–1 mm. wide, 1.5–1.8 mm. long (including the rigid, conspicuously recurved awn, this 0.6–0.8 mm. long), membranous, 5-ribbed, more or less imbricate, rather tardily deciduous, of uniform size, the keel green, the sides brown or straw-colored, the margins hyaline. Stamen 1. Filament 1.2 mm. long, flat. Style 0.5 mm. long; branches 3, 1 mm. long. Achene 0.4 mm. long, 0.4 mm. wide, obtusely trigonous, turbinate, truncate and minutely apiculate at apex, the sides convex, very minutely raised-puncticulate, purplish brown, not stipitate at base.

The following additional specimens have been examined:

BAJA CALIFORNIA: La Paz, *Jones* 24063. El Taste, Cape Region, September 11, 1896, *Brandegee* s. n. San José del Cabo, September 23, 1890, *Brandgee* s. n. SONORA: *Wiggins* 6434, 7271 in part.

Fuirena primiera Jones, Extracts from Contr. **18**: 25. 1933.

Type: Primera Agua, near Loreto, Baja California, October 19, 1930, *Jones* 27604 (Pomona Coll. Herb. No. 194086).

The appearance of Jones' specimen and the details of the bristles are exactly those that have been figured for *F. simplex* Vahl. Though *F. simplex* was based on South American material, the name is now used only for North American and West Indian plants. I have not yet seen a specimen so named that looks like the original material in Vahl's herbarium. I believe there are already several names for Jones' plant, among them *Fuirena schiedeana* Kunth and *F. aristulata* Steud.

PALMAE

Erythea brandegeei var. **spiralis** Jones, Extracts from Contr. **18**: 29. 1933.

Type: San José del Cabo, Baja California, *Brandegee*. Not seen.

This plant has been discussed and illustrated by L. H. Bailey (Gent. Herb. **4**: 100. *fig. 59, right.* 1937), whose comment is as follows: "Trunk showing a distinct spiral arrangement of petiole bases, as in Fig. 59, on the grounds of J. Harrison Wright at Riverside, California, grown with other Brandegee trees from Brandegee seeds (1902) from the San José del Cabo region. The single tree is somewhat dwarfer than its mates, but this may not be significant. It is the 'Tlaco' palm of Brandegee. This palm I have not recognized in the wild. I conclude it is only a growth-form. In the large lot of *E. brandegeei* growing in Balboa Park, San Diego, are one or two trees giving only a slight indication of such a twist."

Erythea loretensis Jones, Extracts from Contr. **18**: 29. 1933.

Type: Loreto, Baja California. Dr. Munz informs me that he believes Jones' description to have been drawn from living plants and no herbarium specimens collected.

According to Dr. L. H. Bailey (Gent. Herb. **4**: 85. 1937) this is a species of SARAL. He writes me that he identifies it tentatively with *S. texana* (Cook) Becc. (Webbia **2**: 78. 1907).

LORANTHACEAE

Loranthus anomalus Jones, Extracts from Contr. **18**: 56. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 17, 1930, *Jones* 27330 (Pomona Coll. Herb. No. 190847).

This is AGONANDRA RACEMOSA (DC.) Standl. (Journ. Washington Acad. Sci. **10**: 506. 1920), of the family Opiliaceae.

OPILIACEAE

See *Loranthus anomalus*, page 94.

POLYGONACEAE

Eriogonum lagunense Jones, Extracts from Contr. **18**: 34. 1933.

Type: Mountain east of Loreto, Baja California, October 17, 1930, *Jones* 27568 (Pomona Coll. Herb. No. 193185).

Miss Susan Stokes regards this as a valid subspecies, ERIOGONUM INFLATUM subsp. LAGUNENSE (Jones) Stokes (Gen. Eriogonum 22. 1936).

AMARANTHACEAE

Iresine obtusa Jones, Extracts from Contr. **18**: 34. 1933.

Type: Borrego Ranch, Baja California, September 24, 1930, *Jones* 27360 (Pomona Coll. Herb. No. 191559).

This is CELOSIA FLORIBUNDA A. Gray (Proc. Amer. Acad. **5**: 167. 1861), described from Cape San Lucas, Baja California (*Xantus* 98; isotype in the National Herbarium).

Iresine pulchella Jones, Extracts from Contr. **18**: 34. 1933.

Type: Cayuca Ranch, Loreto, Baja California, October 23, 1930, *Jones* s. n. (Pomona Coll. Herb. No. 192496). An isotype in the National Herbarium, identical in every respect, bears the number 27355.

This is DICRAURUS ALTERNIFOLIUS (S. Wats.) Uline & Bray (Bot. Gaz. **21**: 355. 1896).

COMMELINACEAE

See footnote 14.

AMARYLLIDACEAE

Hymenocallis jaliscensis Jones, Extracts from Contr. **18**: 33. 1933.

Type: Salcillo, Jalisco, June 1, 1892, *Jones* 458 (Pomona Coll. Herb. No. 119358).

In Herbertia (**1937**: 107. 1937) I reduced this species to the synonymy of HYMENOCALLIS GALVESTONENSIS (Herb.) Baker (Handb. Amaryll. 126. 1888), correctly, I believe. It is the same as *Pringle* 4742 from La Barranca, Guadalajara, distributed as *H. galvestonensis*.

CARYOPHYLLACEAE [15]

Drymaria barrancae Jones, Extracts from Contr. **18**: 65. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 17, 1930, *Jones* 27051a (Pomona Coll. Herb. No. 192857).

This is DRYMARIA VILLOSA Schlecht. & Cham. (Linnaea **5**: 232. 1830).

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[14] **Tradescantia texensis** Jones, Contr. **18**: 22. 1935.

Type: Between Kerrville and San Antonio, Tex., April 23, 1931, *Jones* 28378 (Pomona Coll. Herb.)

Jones cites two specimens, the first being from Roosevelt, Tex., April 22, 1931 (*Jones* 28379), and the second the one cited above. The description applies largely or perhaps wholly to the second specimen, which is accordingly designated as lectotype. It is COMMELINANTIA ANOMALA (Torr.) Tharp (Bull. Torrey Club **49**: 273. 1922). The first cited specimen is a true *Tradescantia*, probably *T. edwardsiana* Tharp, which I know only from description.

[15] The text of *Drymaria* and *Mollugophytum* is contributed by Dr. F. Raymond Fosberg.

Drymaria blasiana Jones, Contr. **15**: 125. 1929.

Type: San Blas, Sinaloa, January 30, 1927, *Jones* 22845 (Pomona Coll. Herb. No. 162740). Another specimen referred here by Jones is from La Barranca, Guadalajara, Jalisco, November 21, 1930, *Jones* 27051.

Drymaria glandulosa Presl, *D. ramosissima* Schlecht. & Cham., and *D. fendleri* S. Wats. all seem to belong to one variable species. A number of varieties are evident or may ultimately be segregated, but they differ very little and scarcely should be considered as species. Jones' species *D. blasiana* is referable to *D. fendleri*, which may be known as **Drymaria glandulosa** Presl var. **fendleri** (S. Wats.) Fosberg, comb. nov.[16] The variety *fendleri* differs from the typical variety in its glabrous upper leaf surface, often erect habit, and often cinereous coloring.

Drymaria fendleri var. **perennis** Jones, Extracts from Contr. **18**: 65. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27050 (Pomona Coll. Herb. No. 192858). The number was erroneously cited in the original description as 27059.

This is distinguished from **Drymaria glandulosa** var. **glandulosa** (Presl) Fosberg, nom. nov.[17] by its perennial habit and almost glabrous leaves and flowers. It may be known as **Drymaria glandulosa** var. **perennis** (Jones) Fosberg, comb. nov.

Drymaria subsessilis Jones, Contr. **15**: 125. 1929.

Type: Ixtlán, Nayarit, February 19, 1927, *Jones* 22848 (Pomona Coll. Herb. No. 162843).

This is DRYMARIA NUMMULARIA Briq. (Ann. Cons. Jard. Bot. Genève **13–14**: 371. 1910.)

Drymaria tepicana Jones, Contr. **15**: 124. 1929.

Type: Tepic, Nayarit, February 16, 1927, *Jones* 22847 (Pomona Coll. Herb. No. 162845).

This is possibly a degenerate form of *Drymaria villosa* Schlecht. & Cham., but as the flowers are too small, the sepals acute, and the seeds too few, it is best to let it stand as valid for the present. The habit and appearance are those of *D. palustris* Schlecht. & Cham., but this resemblance is only superficial.

Mollugophytum Jones, Extracts from Contr. **18**: 35. 1933.

Jones segregated this genus from *Drymaria* L. principally on the basis of its "oval sepals without apiculation or nerves, and with conspicuous and hyaline margins, about equaling the oval-acute capsule." The worthlessness of this character may be well shown by the fact that even one of Jones' own species, *Drymaria subsessilis* (=*D. nummularia* Briq.), has exactly the type of sepals described for *Mollugophytum*, and no one would deny that it is a close relative of *Drymaria cordata* (L.) Willd., the type species of *Drymaria*.

Furthermore, the peculiar selection of species making up the new genus leaves about as much diversity in the two genera resulting from the segregation as in *Drymaria* in the broad sense. Certainly the species of the group containing *D. crassifolia* Benth. and *D. holosteoides* Benth. are no closer to *D. polycarpoides* A. Gray or *D. sperguloides* A. Gray than they are to those of the *D. cordata* group. At present viewing, the genus seems coherent enough in the broad sense. Doubtless a number of groups of species should form subgenera or sections. It is hoped that further study may enable me to define these satisfactorily.

Stellaria lagunensis Jones, Extracts from Contr. **18**: 65. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930,

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[16] Based on *Drymaria fendleri* S. Wats. Proc. Amer. Acad. **17**: 328. 1882.

[17] Based on *Drymaria glandulosa* Presl, Rel. Haenk. **2**: 9. 1831, *sens. str.*

Jones s. n. (Pomona Coll. Herb. No. 192855). In the original description the number is given as 27059, but this does not appear on the label.

This is a species of ARENARIA of the general relationship of *A. saxosa* A. Gray and *A. lanuginosa* (Michx.) Rohrb. It may be a distinct species, but the Mexican representatives of this genus are little known.

RANUNCULACEAE

Clematis barrancae Jones, Extracts from Contr. **18**: 35. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 25, 1930, *Jones* 27028 (Pomona Coll. Herb. No. 191484). The number was omitted in the original description.

This is CLEMATIS DIOICA L. (Syst. Nat. ed. 10, 1084. 1759).

CRUCIFERAE

Iodanthus striatus Jones, Contr. **15**: 126. 1929.

Type: Todos Santos, Baja California, February 17, 1928, *Jones* 24189 (Pomona Coll. Herb. No. 162103).

Identified by Dr. Reed C. Rollins as DRYOPETALON CRENATUM (T. S. Brandeg.) Rollins (Contr. Dudley Herb. **3**: 202. 1941), based on *Sisymbrium crenatum* T. S. Brandeg.

CRASSULACEAE

Sedum barrancae Jones, Extracts from Contr. **18**: 37. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 17, 1930, *Jones* 27845 (Pomona Coll. Herb. No. 191717).

Identified by Dr. Robert T. Clausen as SEDUM EBRACTEATUM DC. (Mém. Crass. 37. *pl. 6B.* 1828).

MIMOSACEAE [18]

Acacia mazatlana Jones, Contr. **15**: 141. 1929.

Type: Mazatlán, Sinaloa, November 20, 1926, *Jones* 22430 (Pomona Coll. Herb. No. 162870).

Jones remarks that this species "seems to belong to the class of *A. rosei* Standl., but apparently quite distinct." He does not, however, mention any of the distinctions. A comparison of Jones' species with the type of ACACIA ROSEI Standl. (Contr. U. S. Nat. Herb. **20**: 187. 1919), which is also from Mazatlán, shows that the two might have been collected from the same bush. They are identical, as is also *Acaciella ortegae* Britt. & Rose (N. Amer. Fl. **23**: 106. 1928), the type of which is also from Mazatlán. Britton and Rose distinguish their species from *A. rosei* by saying that it has acute leaflets and *A. rosei* obtuse, but there are obtuse and acutish leaflets on the type specimens of both species.

Inga megacarpa Jones, Contr. **15**: 140. 1929.

Type: Acaponeta, Nayarit, February 25, 1927, *Jones* 23012 (Pomona Coll. Herb. No. 162426).

The specimen is typical HYMENAEA COURBARIL L. (Sp. Pl. 1192. 1753), a well-known and widely distributed tree of the Caesalpiniaceae, commonly known as "cuapinol" or "guapinol" in Mexico. It is so cited by Britton and Rose (N. Amer. Fl. **23**: 224. 1930). The leaves are, of course, bifoliolate. Jones misunderstood them and described them as "about 6 inches long and nearly as wide, with about 5 pairs of twin leaflets arranged on the rachis alternately," a condition unknown in *Inga*, or in any other plant, so far as I am aware.

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[18] See also *Climacorachis*, page 100.

Leucaena nitens Jones, Contr. **15**: 136. 1929.

Type: Mazatlán, Sinaloa, November 20, 1926, *Jones* 22465 (Pomona Coll. Herb. No. 162848).

At the time of writing his Contribution No. 15, Jones had undoubtedly not seen Britton and Rose's treatment of the Mimosaceae in North American Flora, which appeared in 1928. *Leucaena nitens* is identical with LEUCAENA PALMERI Britt. & Rose (N. Amer. Fl. **23**: 123. 1928), described from Alamos, Sonora. It is extremely probable that *L. sinaloensis* Britt. & Rose (op. cit. 124), from Palmar, Sinaloa, is the same, and both may be only forms of *L. microcarpa* Pose, under which name the isotype of *L. nitens* was distributed to the National Herbarium.

Lysiloma cayucensis Jones, Extracts from Contr. **18**: 39. 1933.

Type: Cayuca Ranch, Sierra de la Giganta, Baja California, October 23, 1930, *Jones* 27251. No specimen can be located in the Jones Herbarium at Pomona College. There is, however, in the U. S. National Herbarium a specimen bearing the data given and labeled *L. cayucensis* in Jones' hand; this may be designated as lectotype. In the Pomona College Herbarium there is a specimen collected in the Cacachilla Mountains, Baja California, October 2, 1930 (*Jones* 27250), and labeled *L. cayucensis* n. sp., but this collection is not mentioned in the original description.

According to the treatment of Britton and Rose, this is LYSILOMA MICROPHYLLA Benth. (Lond. Journ. Bot. **3**: 83. 1844).

Mimosa aspera Jones, Contr. **15**: 133. 1929.

Type: La Barranca, Nayarit, February 21, 1927, *Jones* 22995 (Pomona Coll. Herb.). In the original description Jones failed to indicate a specimen or locality for this species. The type was designated in a later paper (Contr. **16**: 42. 1930).

According to Britton and Rose's treatment this species seems to belong in the segregate genus *Neomimosa*, which, however, has no real character separating it from *Mimosopsis*. *Mimosa aspera* may be retained tentatively as a valid species. The pods are very strongly aculeate on both the valves and margins and seem different from any known species of this group.

Mimosa inaequalis Jones, Extracts from Contr. **18**: 39. 1933 (as *inequalis*), not Poir. (1810).

Type: Guadalajara, Jalisco, November 26, 1930, *Jones* 27267 (Pomona Coll. Herb. No. 191880).

This is a very rare species, MIMOSA TEQUILANA S. Wats. (Proc. Amer. Acad. **22**: 409. 1887), previously known only from collections by Palmer and Pringle at Tequila, Jalisco.

Mimosa lagunensis Jones, Extracts from Contr. **18**: 39. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27270 (Pomona Coll. Herb. No. 191881). The number is erroneously given in the original description as 27290. There is an isotype in the National Herbarium.

Jones' species is based on a mixture. The type, cited above, is MIMOSA XANTII A. Gray (Proc. Amer. Acad. **5**: 157. 1862), described from Cape San Lucas, Baja California. Jones' description is, however, partly drawn from another specimen (not cited), also labeled *M. lagunensis*, from Cayuca Ranch, near Loreto, Baja California, October 23, 1930 (*Jones* 27272). This is a very different species, *Mimosa purpurascens* Robinson. That Jones at some time changed his mind about his species *M. lagunensis* is indicated by the fact that a third collection (*Jones* 24183) was correctly identified and distributed as *M. xantii*. It seems likely to me that *M. margaritae* Britt. & Rose, described from sterile material collected on Santa Margarita Island, Baja California, is also a form of *M. xantii*.

Mimosa mazatlana Jones, Contr. **15**: 133. 1929, not Jones (1933).

Type: Mazatlán, Sinaloa, November 21, 1926, *Jones* 22447 (Pomona Coll. Herb. No. 162432). The second specimen cited was collected at the same locality, November 20, 1926 (not November 29 as stated in the description), *Jones* 22446. There is in the Jones Herbarium a third specimen, from the same locality also, collected November 20, 1926 (*Jones* 22442).

Jones states that the present species seems allied to *M. ervendbergii*, but that is a species with three to five pairs of pinnae, each with about 12 pairs of small leaflets. Jones' species belongs to the well-marked section Sensitivae, which has only one pair of pinnae, these with one or two pairs of large leaflets. It is identical with MIMOSA MANZANILLOANA Rose (Contr. U. S. Nat. Herb. **1**: 326. 1895).

Mimosa mazatlana Jones, Extracts from Contr. **18**: 40. 1933, not Jones (1929).

Type: Mazatlán, Sinaloa, November 20, 1926, *Jones* 22451 (Pomona Coll. Herb. No. 191879). The date is erroneously given in the description as 1928.

This species is MIMOSA AFFINIS Robinson (Bot. Gaz. **16**: 341. 1891), the type of which came from Mazatlán also. Jones evidently overlooked his own previous use of the name *mazatlana* for a different species in 1929. He states that the present species grows also in Uruguay. I do not know the basis for this report, which seems improbable.

Pithecollobium acuminatum Jones, Extracts from Contr. **18**: 38. 1933.

Type: Above Primera Agua, near Loreto, Sierra de la Giganta, Baja California, October 20, 1930, *Jones* 27255 (Pomona Coll. Herb. No. 190794).

This is the rare species ACACIA BRANDEGEANA I. M. Johnst. (Contr. Gray Herb. **75**: 27. 1925), previously known only from the type.

Pithecollobium minutum Jones, Extracts from Contr. **18**: 38. 1933.

Type: Cacachilla Mountains, Baja California, October 2, 1930, *Jones* 27265 (Pomona Coll. Herb. No. 190768).

This is the common and widespread species ACACIA FARNESIANA (L.) Willd. (Sp. Pl. **4**: 1083. 1806).

Pithecollobium minutissimum Jones, Extracts from Contr. **18**: 38. 1933.

Type: As type Jones cited "No. 27266, La Barranca, Guadalajara, Mex. Nov. 25, 1930." No specimen bearing this number has been located. However, Jones remarks, "Fruits vary from sessile to having a stipe an inch long, my no. 27266a." A specimen of 27266a is in the Pomona College Herbarium (No. 190387); it was collected at the same time and place as the cited type and is marked "type" on the sheet by Jones. This is surely authentic material and is probably the actual type. It may be designated as lectotype. The fruits on this sheet are either sessile or short-stipitate (about 5–6 mm.); the "stipes" an inch long mentioned by Jones are the thickened peduncles.

This is the widely distributed Mexican and Central American species ACACIA PENNATULA (Schlecht. & Cham.) Benth. (Lond. Journ. Bot. **1**: 390. 1842).

CAESALPINIACEAE [19]

Caesalpinia blasiana Jones, Contr. **15**: 141. 1929.

Type: San Blas, Sinaloa, January 28, 1927, *Jones* 22987 (Pomona Coll. Herb. No. 162865).

Britton and Rose recognize this as a valid species, under the name *Brasilettia blasiana* (Jones) Britton (N. Amer. Fl. **23**: 321. 1930). I prefer to retain it under the name *Caesalpinia*. It is closely allied to *Caesalpinia platyloba* S. Wats. but probably may be maintained as distinct. The species of *Brasilettia* as treated by Britton and Rose are poorly defined. *Brasilettia pubescens* Britton and *B.*

[19] See also *Inga megacarpa*, page 97, and *Lonchocarpus capensis*, page 103.

pilosa Britton are obviously conspecific, as shown by isotypes in the National Herbarium. They differ from *C. blasiana* in having pubescent pods and leaves.

Cassia stellata Jones, Extracts from Contr. **18**: 40. 1933.

Type: Cacachilla Mountains, Baja California, October 2, 1930, *Jones* 27196 (Pomona Coll. Herb. No. 191866). A specimen of the second collection cited (*Jones* 27200, from Triunfo, Baja California) is in the U. S. National Herbarium.

This is CASSIA VILLOSA Mill. (Gard. Dict. ed. 8, *Cassia* No. 4. 1768), the sole representative of Britton and Rose's segregate genus *Desmodiocassia*. It is distinguished from other Mexican species by having stellate rather than simple pubescence.

Cassia tenuicaulis Jones, Extracts from Contr. **18**: 40. 1933.

Type: Guadalajara, Jalisco, November 26, 1930, *Jones* s. n. (Pomona Coll. Herb. No. 190981).

This is AESCHYNOMENE AMERICANA L. (Sp. Pl. 713. 1753), of the Fabaceae.

Cassia tenuivenosa Jones, Extracts from Contr. **18**: 41. 1933 (*nom. provis.*)

Type: Guadalajara, Jalisco, November 26, 1930, *Jones* 27192 (Pomona Coll. Herb. No. 190704).

Under the heading "*Cassia rotundifolia* Rose?" Jones gives a description of his number 27192, with the comment, "A unique species, which I had called *C. tenuivenosa*, but Rose may have antedated me." There is no species *Cassia rotundifolia* Rose. The specimen is the widespread species CASSIA ROTUNDIFOLIA Pers. (Syn. Pl. **1**: 456. 1805).

FABACEAE [20]

Aeschynomene glomerata Jones, Contr. **15**: 139. 1929.

Type: El Tigre Mine, Acaponeta, Nayarit, March 1, 1927, *Jones* 23025 (Pomona Coll. Herb. No. 162193). The original description gave the number as 23057, but no specimen with that number can be located. The sheet cited above has the correct locality and date, and is marked "type" in Jones' hand, so the cited number is presumably erroneous.

This is AESCHYNOMENE PETRAEA Robinson (Proc. Amer. Acad. **27**: 166. 1892).

Aeschynomene guadalajarana Jones, Extracts from Contr. **18**: 46. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 19, 1930, *Jones* 27212 (Pomona Coll. Herb. No. 191359). The date is erroneously given in the description as November 12.

This is AESCHYNOMENE AMORPHOIDES (S. Wats.) Rose ex Robinson (Proc. Amer. Acad. **29**: 315. 1894). The second specimen cited by Jones (*Jones* 23052 from La Barranca, Nayarit) is correctly identified on the label as *A. amorphoides*.

Astragalus mexiae Jones, Extracts from Contr. **18**: 44. 1933.

Type: Rancho Colorado, Distr. Guerrero, Chihuahua, May 27, 1929, *Mexia* 2563 (Pomona Coll. Herb. No. 201974).

Mrs. Mexia's specimen is somewhat larger and more floriferous, but in detail it corresponds well with an isotype of ASTRAGALUS PRINGLEI S. Wats. (Proc. Amer. Acad. **21**: 449. 1886), which was collected by Pringle in Chihuahua.

Climacorachis.

The genus *Climacorachis*, based on the two new species *C. mexicana* and *C. fruticosa*, was proposed by Hemsley and Rose in 1903, being distinguished from *Aeschynomene* only by having the pod unjointed and indehiscent. This ought to be an important character, really putting the genus out of the tribe Hedysareae. However, it seems likely that it will be found to be an abnormality of some sort, because in other characters the plants are so near to *Aeschynomene americana* as

[20] See also *Cassia tenuicaulis*, above.

to be scarcely if at all distinguishable. Dr. Rose has segregated in the National Herbarium three additional species of *Climacorachis*, but it seems scarcely advisable to publish them at the present time.

Jones reduced the genus *Climacorachis* to *Mimosa* in the following words: "*Climacorachis* Hemsl. & Rose is not distinct enough from the *pudica-pusilla* section of *Mimosa*. I therefore propose the transfer of their names of species as follows Mimosa mexicana (H. & R.) *C. mexicana* H. & R. M. unijuga. *C. fruticosa* H. & R. The body of the pod separates from the rim as in *Mimosa*. The annual forms of *Aeschynomene* are altogether too close to *Mimosa* for comfort."

Jones overlooks the fact that *Mimosa* and *Aeschynomene* belong to different families (or subfamilies), *Mimosa* to the Mimosaceae and *Aeschynomene* to the Fabaceae. *Climacorachis* has, of course, a typical papilionaceous flower. Its reduction to *Aeschynomene* would be reasonable, but its reduction to *Mimosa* is not.

Cracca lupinoides Jones, Contr. **15**: 137. 1929.

Type: El Tigre Mine, Acaponeta, Nayarit, March 1, 1927, *Jones* 23016 (Pomona Coll. Herb. No. 162743).

This may be known as **Tephrosia lupinoides** (Jones) Morton, comb. nov. That Jones' inappropriate specific epithet must be taken up for this species is accidental. The same species was described in 1923 as *Cracca velutina* Rydb., which is, however, a later homonym of *Cracca velutina* (Spreng.) Kuntze. Rydberg's type came from Zopilote, Nayarit (*Lamb* 575).

Macbride (Field Mus. Publ. Bot. **4**: 87. 1925) has reduced Rydberg's species to a variety of *Tephrosia lanata* Mart. & Gal., indicating that he can not see the differences in the flowers described by Rydberg. This may be due to the fact that *Lamb* 575 is a mixture. The isotype in the National Herbarium is sheet No. 275488. Sheet No. 201628 bears exactly the same data but is an entirely different species, neither *lanata* nor *velutina*.

Tephrosia lanata Mart. & Gal., described from Zacuapan, Veracruz, is said by Rydberg to range from Sinaloa to Guerrero and Veracruz, but I have seen no material except from Veracruz. A topotype (*Purpus* 10822), which agrees with material annotated by Rydberg from Mirador, Veracruz (*Sartorius*, *Liebmann*), shows that *T. lanata* is a very different species from *T. lupinoides*. The two may be separated as follows:

Calyx lobes subequal, about 3 times as long as the tube, linear-subulate; flowers 10–12 mm. long; rhachis, pedicels, and calyx lobes hirsute, the hairs white and rather rigid; racemes 8–20 cm. long ..... **T. lanata**

Calyx lobes strongly unequal, equaling or shorter than the tube, two of them triangular, two ovate, and one ovate-lanceolate; flowers 16–20 mm. long; rhachis, pedicels, and calyx lobes densely tomentose, the hairs ferruginous, rather tortuous; racemes 23–50 cm. long ..... **T. lupinoides**

Cracca axillaris Jones, Contr. **15**: 137. 1929.

Type: El Tigre Mine, Acaponeta, Nayarit, March 1, 1927, *Jones* 23022 (Pomona Coll. Herb. No. 162745).

I have been unable to place this plant to my satisfaction. It may be a species of *Tephrosia*, but I consider it too uncertain to transfer the name.

Cracca collina Jones, Contr. **15**: 137. 1929.

Type: Tepic, Nayarit, February 15, 1927, *Jones* 23015 (Pomona Coll. Herb. No. 162744).

This is ERIOSEMA GRANDIFLORUM (Schlecht. & Cham.) Seem. (Bot. Voy. *Herald* 345. 1857). It was so reported by Paul C. Standley (Field Mus. Pudi-Bot. **11**: 161. 1936).

Dalea barrancae Jones, Extracts from Contr. **18**: 43. 1933.[21]

Type: La Barranca, Guadalajara, Jalisco, November 23, 1930, *Jones* 27230 (Pomona Coll. Herb. No. 190386).

This is DALEA INCONSPICUA Schauer (Linnaea **20**: 744. 1847).

Dalea blasiana Jones, Contr. **15**: 138. 1929.

Type: San Blas, Sinaloa, February 1, 1927, *Jones* 23040. No specimen of this species can be located in the Jones Herbarium. Accordingly the isotype in the herbarium of the University of California is designated as lectotype. Additional isotypes are in the Gray Herbarium and the herbaria of the New York Botanical Garden and the California Academy of Sciences.

This is identical with DALEA OCCIDENTALIS (Rydb.) Wiggins (Contr. Dudley Herb. **3**: 53. 1940). This reduction was made previously by Dr. Wiggins (loc. cit.).

Dalea decipiens Jones, Extracts from Contr. **18**: 43. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 16, 1930, *Jones* 27229 (Pomona Coll. Herb. No. 191358).

This is DALEA LEUCOSTACHYS A. Gray (Mem. Amer. Acad. II. **4**: 32. 1849).

Desmodium luteocanescens Jones, Contr. **15**: 127. 1929.

Type: Acaponeta, Nayarit, March 1, 1927, *Jones* 23054 (Pomona Coll. Herb. No. 162273).

Identified by Dr. Bernice G. Schubert as DESMODIUM CINEREUM (H. B. K.) DC. (Prodr. **2**: 330. 1825). Some other specimens distributed under the same number and name by Jones are *Desmodium plicatum* Schlecht. & Cham.

Desmodium luteocanescens var. **curtum** Jones, Contr. **15**: 127. 1929.

Type: Ixtlán, Nayarit, February 18, 1927, *Jones* 23055 (Pomona Coll. Herb. No. 162191).

Although Jones' new species *D. luteocanescens* proves to be a synonym, Dr. Schubert believes that the plant described as var. *curtum* may represent a distinct

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[21] **Dalea hutchinsoniae** Jones, Extracts from Contr. **18**: 42. 1933.

Type: Pinos Altos Mountains, N. Mex., September 24, 1931, *Jones* 28709 (Pomona Coll. Herb. No. 187429). In the description the collector's number is omitted, and the date erroneously given as September 23.

This is DALEA FILIFORMIS A. Gray (Pl. Wright. **2**: 39. 1853), as stated by Kearney and Peebles (Fl. Pl. & Ferns Arizona 459. 1942.)

Dalea hutchinsoniae var. **anomala** Jones, Extracts from Contr. **18**: 42. 1933.

Type: Chiricahua Mountains, Ariz., September 22, 1931, *Jones* s. n. (Pomona Coll. Herb. No. 187431).

The variety of *Dalea polygonoides* with glabrous calyx tube was described as var. *laevituba* Kearney & Peebles (Journ. Washington Acad. Sci. **29**: 483. 1939). The plant described by Jones as var. *anomala* of *D. hutchinsoniae* proves to be the same. Inasmuch as Jones' varietal name has priority, the following new combination is necessary: **Dalea polygonoides** A. Gray var. **anomala** (Jones) Morton.

Dalea nummularia Jones, Extracts from Contr. **18**: 41. 1933.

Type: Green River, Utah, May 28, 1914, *Jones* s. n. (Pomona Coll. Herb. No. 28257). An isotype is in the National Herbarium.

Jones compares this species with *D. johnsonii* S. Wats., but it is not related closely to that. It is either a synonym or a variety of DALEA POLYADENIA Torr. (ex S. Wats. in King, Geol. Expl. 40th Par. **5**: 64. 1871). The second specimen cited by Jones (Willow Spring, Ariz., June 11, 1980, *Jones* s. n.) is the very rare species *Parryella rotundata* Wooton, previously known only from the type material. Jones' specimen is in good fruit and shows that *P. rotundata* is amply distinct from the common *Parryella filifolia* Torr. & Gray.

species, as yet undescribed. A fuller study of related species will be necessary in order to reach a decision.

Diphysa vesicaria Jones, Contr. **15**: 136. 1929.

Type: El Tigre Mine, Acaponeta, Nayarit, March 1, 1927, *Jones* 22986 (Pomona Coll. Herb. No. 162849).

This is DIPHYSA PUBERULENTA Rydb. (N. Amer. Fl. **24**: 214. 1924), the type of which is from Acaponeta also.

Lonchocarpus capensis Jones, Extracts from Contr. **18**: 46. 1933.

Type: San José del Cabo, Baja California, September 14, 1930, *Jones* 27259 (Pomona Coll. Herb. No. 191860).

This is the common tamarind, TAMARINDUS INDICA L. (Sp. Pl. 31. 1753), which is rather widely naturalized in tropical America.

Lotus ramulosus Jones, Contr. **15**: 138. 1929.

Type: Laguna Mountains, Baja California, March 2, 1928, *Jones* 24271 (Pomona Coll. Herb. No. 162204).

This is *Lotus oroboides* (H. B. K.) Ottley var. *ramulosus* (Jones) Ottley (Brittonia **5**: 107. 1944). The corolla of var. *ramulosus* is white (the banner tipped with purple) rather than yellow, as in typical *L. oroboides*. Also the foliose, usually trifoliolate bract at the base of the inflorescence usually present in the typical variety is absent in var. *ramulosus*.

Lupinus bartolomei Jones, Contr. **15**: 142. 1929.

Type: San Bártolo, Baja California, February 27, 1928, *Jones* 24163 (Pomona Coll. Herb. No. 162866). In the description the locality is misspelled San Bartolomo. The town of San Bártolo is in southern Baja California, about halfway between La Paz and San José del Cabo. It is mentioned by Jones in Contribution No. 15, page 93.

C. Piper Smith (Sp. Lupin. **1**: 24. 1938) cites this as a synonym of LUPINUS SPARSIFLORUS Benth. var. INSIGNITUS C. P. Smith (Bull. Torrey Club **47**: 499. 1920).

Lupinus lagunensis Jones, Contr. **15**: 141. 1929.

Type: Laguna Mountains, Baja California, March 2, 1928, *Jones* 24270 (Pomona Coll. Herb. No. 162868).

Identified by C. Piper Smith as *Lupinus sparsiflorus* var. *insignitus* C. P. Smith, and so cited in his Species Lupinorum (**1**: 24. 1938).

Although Smith considers *L. bartolomei* and *L. lagunensis* the same, I believe it doubtful. In commenting on the two, he writes "The former [i.e., *L. bartolomei*] is evidently from a soil rich in moisture and plant food, while the latter [*L. lagunensis*] from a location lacking a goodly supply of these two essentials." This inference is in contradiction to Jones' statement that *L. bartolomei* grows in drifting sand, scarcely a "soil rich in moisture and plant food." Jones knew more about the habitats of his species than he did concerning their relationships, although he may have been going on memory only in this case and is not to be trusted implicitly. However, his two species do have some obvious differences. The general appearance is different, especially in the elongate, dense inflorescence of *L. bartolomei* and the short, sparse one of *L. lagunensis*. The leaflets of *L. bartolomei* are conspicuously setulose beneath, but those of *L. lagunensis* are entirely glabrous on both surfaces, although they occasionally have a few scattered cilia on the margins. The pods of *L. bartolomei* are uniformly 5-seeded, those of *L. lagunensis* only 2-seeded. *Lupinus bartolomei* is an annual (as is *L. sparsiflorus*), but Jones describes *L. lagunensis* as a perennial, and from the type it looks as though he were correct.

My conclusion is that *L. bartolomei* is correctly identified as *L. sparsiflorus* var. *insignitus*, but that *L. lagunensis* is different and requires further study.

Lupinus rotundifolius Jones, Contr. **15**: 142. 1929.

Type: Tepic, Nayarit, February 10, 1927, *Jones* 23041 (Pomona Coll. Herb. No. 162788).

Identified by C. Piper Smith as LUPINUS EHRENBERGII Schlecht. (Linnaea **12**: 334. 1832), and so cited by him in Species Lupinorum (**1**: 70. 1938).

Nissoloides cylindrica Jones, Contr. **18**: 135. 1935 (without Latin diagnosis).

Type: Guadalajara, Jalisco, November 27, 1930, *Jones* 27223. The type has not been examined. There is an isotype in the National Herbarium (No. 1699095).

This new genus was marked by Jones "3784," by which he implied that it was to be inserted after genus 3784 of Dalla Torre and Harms' Genera Siphonogamarum, i. e., *Nissolia* Jacq. The plant is the well-known and widely distributed species DESMODIUM SCORPIURUS (Swartz) Desv. (Journ. de Bot. **1**: 122. 1813.)

Ononis crotalarioides Jones, Contr. **15**: 138. 1929.

Type: Tepic, Nayarit, February 14, 1927, *Jones* 23039 (Pomona Coll. Herb. No. 162897).

This is surely one of Jones' strangest aberrations. His specimen is the chickpea, CICER ARIETINUM L. (Sp. Pl. 738. 1753), which must have been well known to Jones, for it is very commonly cultivated in Mexico. The genus *Ononis* is confined to the Mediterranean region, and belongs to a different tribe.

Phaseolus atomiferus Jones, Contr. **15**: 136. 1929.

Type: Todos Santos, Baja California, February 17, 1928, *Jones* 24278 (Pomona Coll. Herb. No. 162840).

This is RHYNCHOSIA PYRAMIDALIS (Lam.) Urban (Repert. Sp. Nov. Fedde **15**: 318. 1918).

Phaseolus barrancae Jones, Extracts from Contr. **18**: 46. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 21, 1930, *Jones* 27177 (Pomona Coll. Herb. No. 191296).

This is CANAVALIA VILLOSA Benth. (Ann. Wien. Mus. Naturg. **2**: 135. 1837) or, following Piper, *Wenderothia villosa* (Benth.) Piper (Contr. U. S. Nat. Herb. **20**: 584. 1925).

Phaseolus sanctorum Jones, Contr. **15**: 140. 1929.

Type: Todos Santos, Baja California, February 19, 1928, *Jones* 24141 (Pomona Coll. Herb. No. 190810).

Although closely related to *Phaseolus filiformis* Benth., this seems to be a recognizable species, differing in its thicker, more densely pubescent petioles and thicker, scarcely lobate leaflets.

Psoralea decipiens Jones, Extracts from Contr. **18**: 41. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 23, 1930, *Jones* 27178 (Pomona Coll. Herb. No. 190978).

There seems to be no significant difference between Jones' specimen and plants of PSORALEA RHOMBIFOLIA Torr. & Gray (Fl. N. Amer. **1**: 303. 1838), from Texas and northeastern Mexico. Jones' collection extends the range of this species a good deal to the south and west.

Stylosanthes prostrata Jones, Contr. **15**: 135. 1929.

Type: Todos Santos, Baja California, February 15, 1928, *Jones* 24269 (Pomona Coll. Herb. No. 162205).

This is STYLOSANTHES VISCOSA Swartz (Prodr. Veg. Ind. Occ. 108. 1788), a common and widely distributed species. The second specimen cited (*Jones* 24002, from San José del Cabo, Baja California) is the same.

Tephrosia fruticosa Jones, Extracts from Contr. **18**: 43. 1933, not DC. (1825).

Type: La Barranca, Guadalajara, Jalisco, November 17, 1930, *Jones* 27207.

The type can not be found in the Jones Herbarium. From the short and un-

detailed description I have not been able to place this species. Jones remarks, "This may be an *Eriosema*." Although the critical points are not mentioned, the description does suggest *Eriosema* more than *Tephrosia*, although it does not correspond exactly with any Mexican species.

LINACEAE

Linum gracilentum Jones, Contr. **15**: 148. 1929.

Type: Tepic, Nayarit, February 15, 1927, *Jones* 22882 (Pomona Coll. Herb. No. 162756).

This is LINUM CRUCIATA Planch. (in Hook. Lond. Journ. Bot. **7**: 499. 1848), the type of which is also from Tepic.

RUTACEAE

Helietta barrancae Jones, Extracts from Contr. **18**: 48. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 19, 1930, *Jones* 27091 (Pomona Coll. Herb. No. 190773).

This is THOUINIA ACUMINATA S. Wats. (Proc. Amer. Acad. **25**: 145. 1890), of the Sapindaceae. The type was collected by Pringle at the same locality.

MALPIGHIACEAE [22]

Malpighia sonorae Jones, Contr. **15**: 128. 1929.

Type: Guaymas, Sonora, November 2, 1926, *Jones* 22598 (Pomona Coll. Herb. No. 162233).

This is MALPIGHIA WATSONII Rose (Contr. U. S. Nat. Herb. **1**: 310. 1895), which is based on *Bunchosia parvifolia* S. Wats. (Proc. Amer. Acad. **24**: 42. 1889). The type of Watson's species is also from Guaymas and agrees in every detail with the type of *M. sonorae* Jones. Standley (Contr. U. S. Nat. Herb. **23**: 566. 1923) reduced *M. watsonii* to the synonymy of *M. ovata* Rose, and Niedenzu reduced both *M. watsonii* and *M. ovata* to *M. glabra* L., possibly correctly, although that seems doubtful to me. The genus requires study as to its Mexican representatives.

EUPHORBIACEAE [23]

Argythamnia bicolor Jones, Contr. **15**: 127. 1929.

Type: Hermosillo, Sonora, October 26, 1926, *Jones* 22727 (Pomona Coll. Herb. No. 162602).

Comparison with an isotype of DITAXIS ADENOPHORA (A. Gray) Pax & Hoffmann (in Engl. Pflanzenreich IV. **147**^{vi}: 65. 1912) in the U. S. National Herbarium, plus an ample suite of specimens and previous examination of the type of *D. adenophora* at the Gray Herbarium,[24] shows Jones' species to be identical.

Bernardia mazatlana Jones, Extracts from Contr. **18**: 49. 1933.

Type: Mazatlán, Sinaloa, November 20, 1926, *Jones* 22626 (Pomona Coll. Herb. No. 192752). The date was given in the description as November 30.

ACALYPHA MICROPHYLLA Seemann (Bot. Voy. Herald 278. 1857) is identical and earlier. As to the basis of my interpretation of *A. microphylla* and its separation from *A. chamaedrifolia* (Lam.) Muell. Arg. of the West Indies and Florida, see Contr. Gray Herb. **124**: 40. 1939. Pax and Hoffmann (in Engl. Pflanzenreich IV. **147**^{xvi}: 30. 1924) combine the two, though somewhat doubtfully,

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[22] See also *Jatropha decipiens*, page 108.

[23] Text contributed by Dr. Louis Cutter Wheeler, except for *Jatropha* and *Mercurialis*.

[24] See Contr. Gray Herb. **127**: 56. 1939.

but separate (op. cit. 24) *A. purpusii* T. S. Brandeg. (Univ. Calif. Publ. Bot. **6**: 53. 1914) from *A. chamaedrifolia* by:

Base of leaf acute.....A. purpusii
Base of leaf rotund to cordate.....A. chamaedrifolia

Yet they described (op. cit. 29) *A. purpusii* as having the leaf base "cuneatus vel truncatus." An isotype of *A. purpusii* in the National Herbarium (from Picacho to San Gerónimo, Oaxaca, Mexico, October 1913, *C. A. Purpus* 6894) has about as many leaf bases rotund-truncate as slightly cuneate. *Acalypha purpusii* is very doubtfully distinct from *A. microphylla*.

Croton alvaradonis Jones, Extracts from Contr. **18**: 48. 1933.

Type: Trail down the west side of the Laguna Mountains, Baja California, September 24, 1930, *Jones* 27827 (Pomona Coll. Herb. No. 191683).

This is founded on a specimen of the same number as *Croton lagunensis* Jones (*q.v.*), and is identical with that species. Apparently Jones had two specimens of the same collection at different places in his stack of specimens and so described the same collection twice.

Croton attenuatus Jones, Extracts from Contr. **18**: 47. 1933.

Type: Cayuca Ranch, Loreto, Baja California, October 23, 1930, *Jones* 27500 (Pomona Coll. Herb. No. 192853).

This is CROTON SONORAE Torr. (U.S. & Mex. Bound. Bot. 194. 1859).

Croton blasianus Jones, Extracts from Contr. **18**: 49. 1933.

Type: San Blas, Sinaloa, January 28, 1927, *Jones* 23304 (Pomona Coll. Herb. No. 162160).

This seems best referred to CROTON ALAMOSANUS Rose (Contr. U. S. Nat. Herb. **1**: 111. 1891). The type of Rose's species is only in bud, but other more mature specimens seem to match and together with Jones' specimen make an apparently natural unit.

Croton boregensis [*sic*] Jones, Extracts from Contr. **18**: 49. 1933.

Type: Borrego Ranch, Baja California, September 20, 1930, *Jones* 27496 (Pomona Coll. Herb. No. 191396).

Since no specimen in the U. S. National Herbarium matches this, it may be considered a valid species.

Croton crenulatus Jones, Extracts from Contr. **18**: 48. 1933.

Type: Cayuca Ranch, Loreto, Baja California, October 23, 1930, *Jones* 27499 (Pomona Coll. Herb. No. 191581). Isotype at the Gray Herbarium.

This is BERNARDIA MEXICANA (Hook. & Arn.) Muell. Arg. (Linnaea **34**: 171. 1865). It may be referred to var. *genuina* for the present, although it is possibly varietally distinct. For further discussion see Contr. Gray Herb. **124**: 36. 1939, and *op. cit.* **127**: 56–67. 1939.

Croton lagunensis Jones, Extracts from Contr. **18**: 55. 1933.

Type: Trail down the west side of the Laguna Mountains, Baja California, September 24, 1930, *Jones* 27827 (Pomona Coll. Herb. No. 191711).

This is a *Bernardia*, and may be known as **Bernardia lagunensis** (Jones) L. C. Wheeler, comb. nov. In Pax's treatment (in Engl. Pflanzenreich IV. **147** VII: 22. 1914) this seems to key to section *Alevia* and, if it belongs in that section, is most closely related to *B. interrupta* (Schlecht.) Muell. Arg. However, the styles are so withered, owing to the fruiting condition of the specimen, that it is difficult to be sure that the plant does not belong in the section *Tyria*. The usually 2-loculed capsules are distinctive in the genus, except for *B. obovata* I. M. Johnst. from the Big Bend, Brewster County, Tex. The two bear little resemblance to each other aside from this single character.

Euphorbia corallifera Jones, Extracts from Contr. **18**: 50. 1933.

Type: Cayuca Ranch, Loreto, Baja California, October 23, 1930, *Jones* 27545 (Pomona Coll. Herb. No. 191186).

This is EUPHORBIA XANTII Engelm. (ex Boiss. in DC. Prodr. **15**[2]: 62. 1865), a species with variable foliage occurring in southern Baja California.

Euphorbia espirituensis Jones, Extracts from Contr. **18**: 50. 1933.

Type: Espíritu Santo Island, Baja California, September 30, 1930, *Jones* 27505 (Pomona Coll. Herb. No. 193546). Isotype in the U. S. National Herbarium.

This is EUPHORBIA MAGDALENAE Benth. (Bot. Voy. Sulphur 50. 1844), at least as commonly interpreted. The type of *E. magdalenae* has not been examined.

Euphorbia floccosiuscula Jones, Contr. **15**: 145. 1929.

Type: Hermosillo, Sonora, October 27, 1926, *Jones* 22739 (Pomona Coll. Herb. No. 162576). Isotype in the Missouri Botanical Garden Herbarium.

This differs in no consequential respect from EUPHORBIA SETILOBA Engelm. (ex Torr. in U. S. Rep. Expl. Miss. Pacif. **5**: 364. 1857), although Jones' plants have unusually long internodes, suggesting that they grew in a moist habitat. See Bull. Torrey Club **63**: 429–430. 1936, and Rhodora **43**: 245–246. 1941, for further discussion.

Euphorbia gladiosa Jones, Contr. **15**: 144. 1929.

Type: Guaymas, Sonora, November 2, 1926, *Jones* 22613 (Pomona Coll. Herb. No. 162575).

This is the same variant as *Euphorbia capitellata* var. *laxiflora* S. Wats., which was first deemed worthy of recognition (Bull. Torrey Club **62**: 538. 1935), but examination of more specimens revealed so many intermediates that the variety was later abandoned (Rhodora **42**: 174. 1941) and reduced to EUPHORBIA CAPITELLATA Engelm. (in Torr. U. S. & Mex. Bound. Bot. 188. 1859).

Euphorbia longepetiolata Jones, Extracts fron Contr. **18**: 55. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 19, 1930, *Jones* 27514 (Pomona Coll. Herb. No. 191687). See discussion under *E. tenuissima*, below.

This resembles *Euphorbia graminea* Jacq. in habit but differs in the narrow appendages. It may be more closely related to *E. succedanea* L. C. Wheeler, from which the diffuse branching and narrower appendages distinguish it.

Euphorbia multifoliosa Jones, Extracts from Contr. **18**: 54. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 17, 1930, *Jones* s. n. (Pomona Coll. Herb. No. 191633). Jones stated in the description that this was No. 27517, but no number appears on the label.

This is EUPHORBIA DIOECA H. B. K. (Nov. Gen. & Sp. **2**: 53. 1817).

Euphorbia nigropurpurea Jones, Contr. **15**: 145. 1929, in obs.

Type: Tepic, Nayarit, February 15, 1927, *Jones* 23310 (Pomona Coll. Herb. No. 162558). The date is given in the description as February 14.

This is EUPHORBIA STRIGOSA Hook. & Arn. (Bot. Beechey's Voy. 310. 1836–40) as commonly interpreted in United States herbaria. This interpretation is probably correct and must stand until proved wrong. After some justifiable grumbling about the poor original description of *E. strigosa*, Jones concludes: "In case this proves to be different from *E. strigosa* it may bear the name *E. nigropurpurea*." Being provisional, the binomial has no standing. The rule [25] passed by the International Botanical Congress in 1935 is: "A name of a taxonomic group is not validly published unless it is definitely accepted by the author

[25] Proc. Zesde Internat. Bot. Congr. **1**: 365. 1936. See also Sprague, Internat. Bot. Congr. 1930, Nomenclature Proposals of British Botanists 16–17. Art. 44. 1929; Sprague in Journ. Bot. Brit. & For. **74**: 75. 1936; and Rhodora **40**: 319. 1938, for discussion and examples.

who publishes it. A name proposed provisionally (*nomen provisorium*) in anticipation of the eventual acceptance of the group, or of a particular circumscription, position or rank of a group, or merely incidentally mentioned is not validly published."

Euphorbia tenuissima Jones, Extracts from Contr. **18**: 55. 1933.

The type is cited by Jones as "No. 27514, La Barranca, Guadalajara, Nov. 25, 1930." The type of *E. longepetiolata* is cited "No. 27514a, La Barranca, Guadalajara, Nov. 12, 1930, and same loc. no. 27538." It is evident that the printed data are confused. The specimen that bears the name *E. longepetiolata* and is the species so described by Jones is numbered 27514 and was collected Nov. 19, 1930. The specimen which Jones described as *E. tenuissima* is No. 27538, and was collected November 23, 1930. There is no specimen at all bearing the number 27514a. Possibly Jones had at first combined both species under the name *longepetiolata*, and then in segregating *tenuissima* he interchanged the numbers. The dates are more nearly accurate, although not entirely so. If we take as the type the plant that fits the description, the type of *E. tenuissima* is: La Barranca, Guadalajara, Jalisco, November 23, 1930, *Jones* 27538 (Pomona Coll. Herb. No. 191023.)

This species is closest to *Euphorbia subcaerulea* Rob. & Greenm. (Proc. Amer. Acad. **32**: 37. 1896) but differs in the much narrower appendages.

Jatropha decipiens Jones, Extracts from Contr. **18**: 56. 1933.

Type: La Barranca, Guadalajara, Jalisco, Nov. 25, 1930, *Jones* 27828 (Pomona Coll. Herb. No. 191584).

This is BUNCHOSIA PALMERI S. Wats. (Proc. Amer. Acad. **22**: 401. 1887), of the Malpighiaceae.

Mercurialis glabra Jones, Extracts from Contr. **18**: 68. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 17, 1930, *Jones* s. n. (Pomona Coll. Herb. No. 190992).

This is a species of Violaceae, HYBANTHUS ATTENUATUS (Humb. & Bonpl.) G. K. Schulze (Notizbl. Bot. Gart. Berlin **12**: 114. 1934), based on *Ionidium attenuatum* Humb. & Bonpl. (ex Roem. & Schult. Syst. Veg. **5**: 402. 1819).

Phyllanthus viridis Jones, Extracts from Contr. **18**: 48. 1933.

Type: Cacachilla Mountains, Baja California, October 2, 1930, *Jones* 27503 (Pomona Coll. Herb. No. 191581). Isotypes in the Gray Herbarium and the U. S. National Herbarium.

This is COLUBRINA GLABRA S. Wats. (Proc. Amer. Acad. **24**: 44. 1889), of the family Rhamnaceae. Reduction previously made in Contr. Gray Herb. **124**: 36 1939.

Sebastiana sarmentosa Jones, Extracts from Contr. **18**: 49. 1933.

Type: Primera Agua, near Loreto, Baja California, October 19, 1930, *Jones* 27544. The type in the Pomona College Herbarium has not been seen. There is an isotype in the Gray Herbarium . The date was published erroneously as October 15. The second collection cited, "near Loreto, no. 27545," must be an error, since that number is the type number of *Euphorbia corallifera*. The collection probably intended is: Mountain east of Loreto, October 17, 1930, *Jones* 27543 (Pomona Coll. Herb.; Gray Herb.; Wheeler Herb.).

This is DITAXIS BRANDEGEI (Millsp.) Rose & Standl. (Contr. U. S. Nat. Herb. **16**: 13. 1912).

Tragia scandens Jones, Extracts from Contr. **18**: 49. 1933, not Muell. Arg. (1865).

Type: Guaymas, Sonora, January 26, 1927, *Jones* 23300 (Pomona Coll. Herb. No. 162552).

This is TRAGIA AMBLYODONTA (Muell. Arg.) Pax & Hoffm. (in Engl. Pflanzenreich IV. **147** [ix–xi]: 51. 1919), which is based on *T. nepetifolia* Cav. var. *amblyodonta* Muell. Arg. (in DC. Prodr. **15**[2]: 934. 1866).

CALLITRICHACEAE

Callitriche mexicana Jones, Contr. **15**: 124. 1929.

Type: Tepic, Nayarit, February 11, 1927, *Jones* 22877. The type cannot be located in the Jones Herbarium. There is an isotype in the herbarium of the New York Botanical Garden which I designate as lectotype. Additional isotypes are in the Gray Herbarium and the herbaria of the California Academy of Sciences and University of California.

This is CALLITRICHE AUSTINII Engelm. (in A. Gray, Man. ed. 5, 428. 1867), the commonest species of the genus in Mexico. Small has adopted for this species the name *C. terrestris* Raf., but it seems better for the present at least to retain the well-known name *C. austinii*. Jones describes the fruits as nearly sessile, but they are really short-pedunculate, as in typical *C. austinii*. Jones' statement that the plant grows wholly submerged in water is probably not true. It seems to be a form growing in muddy places.

CELASTRACEAE

Mortonia aspera Jones, Extracts from Contr. **18**: 56. 1933.

Type: Arroyo Undo, Sierra de la Giganta, Baja California, October 26, 1930, *Jones* 27502.

The type has not been located. The only thing fairly certain about this species is that it is not a *Mortonia*.

SAPINDACEAE [26]

Dodonaea lagunensis Jones, Extracts from Contr. **18**: 57. 1933.

Type: Trail down the Laguna Mountains, Baja California, September 24, 1930, *Jones* 27087 (Pomona Coll. Herb. No. 190779).

Jones' specimen agrees with the bulk of the Mexican material of the widespread and notoriously variable species DODONAEA VISCOSA Jacq. (Enum. Pl. Carib. 19. 1760). According to Radlkofer's treatment it would be called var. *vulgaris* f. *burmanniana* (DC.) Radlk. Radlkofer lists as synonyms of *D. viscosa* some 46 specific segregates which have been proposed.

Serjania papilio Jones, Extracts from Contr. **18**: 64. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 19, 1930, *Jones* 27327 (Pomona Coll. Herb. No. 193445).

This is SERJANIA SCHIEDEANA Schlecht. (Linnaea **18**: 44. 1844).

RHAMNACEAE

See *Phyllanthus viridis*, page 108.

VITACEAE

Vitis peninsularis Jones, Extracts from Contr. **18**: 57. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27150 (Pomona Coll. Herb. No. 190780).

This may be a distinct species, related perhaps to *Vitis arizonica* Engelm.

TILIACEAE

See *Buttneria trilobata*, page 110.

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[26] See also *Helietta barrancae*, page 105.

MALVACEAE

Abutilon barrancae Jones, Extracts from Contr. **18**: 57. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 19, 1930, *Jones* 27162 (Pomona Coll. Herb. No. 193309).

This is the rather rare species PSEUDABUTILON SCABRUM (Presl) R. E. Fries (Svensk. Vet. Akad. Handl. **43**[4]: 103. 1908), known only from Jalisco.

Kosteletzkya bracteosa Jones, Contr. **15**: 147. 1929 (as *Kosteletzkia*).

Type: San Blas, Sinaloa, February 1, 1927, *Jones* 22863 (Pomona Coll. Herb. No. 162135).

This is HIBISCUS BRASILIENSIS L. (Sp. Pl. ed. 2, 977. 1763).

Sida ampla Jones, Contr. **15**: 146. 1929.

Type: Acaponeta, Nayarit, February 25, 1927, *Jones* 22858 (Pomona Coll. Herb. No. 162715). The second specimen cited (El Tigre Mine, Acaponeta, March 1, 1927) bears the same number (22858).

Jones' type exactly matches the plant of western and southern Mexico treated as SIDA CORDIFOLIA L. (Sp. Pl. 684. 1753) by Standley (Contr. U. S. Nat. Herb. **23**: 764. 1923). It is possible that more than one species is currently passing under this name. Some of the Central American specimens look somewhat different.

Sida rajoides Jones, Extracts from Contr. **18**: 58. 1933.

Type: "Primiera Agua, Sierra Giganta Mountains, Baja California, October 19, 1930, *Jones* 27163." A specimen of this species has not been located in the Jones Herbarium. However, there is a specimen in the National Herbarium labeled by Jones *Sida rajoides* n. sp. and collected at the same time and place. It agrees entirely with the description and is accordingly designated as lectotype. It bears the number 27168, and so it may be assumed that the printed number is erroneous.

This is MELOCHIA TOMENTOSA L. (Syst. Nat. ed. 10, 1140. 1759), of the Sterculiaceae, a species very common and widely distributed in Mexico.

Sida stenopetala Jones, Extracts from Contr. **18**: 58. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 16, 1930, *Jones* 27142 (Pomona Coll. Herb. No. 191931).

This is PERIPTERA PUNICEA (Lag.) DC. (Prodr. **1**: 459. 1824). *Periptera* has often been considered merely a section of *Anoda*, but A. A. Bullock (Kew Bull. **1937**: 75) has restored it to generic rank, apparently with good reason.

STERCULIACEAE[27]

Buttneria trilobata Jones, Contr. **15**: 149. 1929.

Type: Mazatlán, Sinaloa, November 20, 1926, *Jones* 22538 (Pomona Coll. Herb. No. 162231).

This is a species of TRIUMFETTA (Tiliaceae). It does not agree exactly with any species known from Mexico. If it proves to be valid, it will require a new name, because of the existence of *T. trilobata* Noronha.

CISTACEAE

Lechea depressa Jones, Extracts from Contr. **18**: 59. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27117 (Pomona Coll. Herb. No. 191438).

This is cited by Dr. A. R. Hodgdon (Contr. Gray Herb. **121**: 66. 1938) as LECHEA TRIPETALA (Moc. & Sesse) Britton (Bull. Torrey Club **21**: 252. 1894). Dr. Hodgdon's comment is as follows: "*L. depressa* Jones is a somewhat depauperate semiprostrate plant which in all essential characters is like *L. tripetala*."

[27] See *Sida rajoides*, above.

Jones was not segregating his species from *L. tripetala*, but considered it manifestly related to *L. minor* L. of the eastern United States.

VIOLACEAE [28]

Hybanthus peninsularis Jones, Extracts from Contr. **18**: 59. 1933.

Type: Cayuca Ranch, Loreto, Baja California, October 23, 1930, *Jones* 27830 (Pomona Coll. Herb. No. 191448). In the original description Jones cited two collections but failed to mention the numbers. This, the second specimen cited, is marked "type" by him on the label. The first collection cited is: Borrego Ranch, Baja California, September 20, 1930, *Jones* 27832. It represents the same species.

I have previously (Contr. U. S. Nat. Herb. **29**: 78. 1944) reduced this to the synonymy of HYBANTHUS FRUTICULOSUS (Benth.) I. M. Johnst. (Proc. Calif. Acad. IV. **12**: 1097. 1924). The specimens belong to the broad-leaved form described as *Calceolaria tenuifolia* Dowell. .

LOASACEAE

Mentzelia barrancae Jones, Extracts from Contr. **18**: 60. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 16, 1930, *Jones* 27101 (Pomona Coll. Herb. No. 191847). The date is given erroneously in the description as November 15.

This is MENTZELIA HISPIDA Willd. (Sp. Pl. **2**[2]: 1176. 1799).

LYTHRACEAE [29]

Parsonsia dispersa Jones, Extracts from Contr. **18**: 63. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 25, 1930, *Jones* 27398 (Pomona Coll. Herb. No. 191563).

Identified by Dr. R. C. Foster as CUPHEA PROCUMBENS Cav. (Icon. Pl. **4**: 55. *pl. 380.* 1797).

Parsonsia purpureo-calycis Jones, Extracts from Contr. **18**: 64. 1933.

Type: Mountain east of Loreto, Baja California, October 17, 1930, *Jones* 27148 (Pomona Coll. Herb. No. 191028).

Identified by Dr. R. C. Foster as CUPHEA LLAVEA Lex. in Llave & Lex. (Nov. Veg. Descr. **1**: 20. 1824).

Cuphea watsonii Jones, Extracts from Contr. **18**: 50. 1933.[30]

Type: Tequila, Jalisco, September 1893, *Pringle* 4616.

I have not seen the type but have studied two isotypes in the National Herbarium. These agree with Jones' description, except that the petioles are described as 1 mm. long, an obvious error for 1 cm. The Pringle collection was identified and distributed as CUPHEA PALMERI S. Wats. (Proc. Amer. Acad. **21**: 428. 1886), and it is so cited by Koehne in his monograph (in Engl. Pflanzenreich IV. **216**: 157. 1903). The plants agree with an isotype of *C. palmeri* in the National Herbarium.

ONAGRACEAE

Jussiaea clavata Jones, Contr. **15**: 131. 1929.

Type: Acaponeta, Nayarit, February 24, 1927, *Jones* 22871.

Cited by Dr. P. A. Munz as JUSSIAEA SUFFRUTICOSA var. OCTOFILA (DC.) Munz (Darwiniana **4**: 239. 1942).

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[28] See also *Mercurialis glabra*, page 108.

[29] See also *Ludwigia tepicana*, page 112.

[30] Another specimen (Tepic, Nayarit, February 9, 1927, *Jones* 23194) marked by Jones as a new species of *Cuphea* with a specific name meaning glandular is identified by Dr. Foster as *Cuphea hookeriana* Walp.

Lopezia globosa Jones, Contr. **15**: 147. 1929.

Type: Tepic, Nayarit, February 9, 1927, *Jones* 23299.

Identified by Dr. P. A. Munz as LOPEZIA PUBESCENS H. B. K. (Nov. Gen. & Sp. **6**: 96. 1823).

Ludwigia tepicana Jones, Contr. **15**: 131. 1929.

Type: Tepic, Nayarit, February 12, 1927, *Jones* 22874.

Cited by Paul C. Standley (Field Mus. Publ. Bot. **8**: 28. 1930) as HEIMIA SALICIFOLIA (H. B. K.) Link (Enum. Pl. **2**: 3. 1822), of the family Lythraceae.

UMBELLIFERAE

Apium depressum Jones, Extracts from Contr. **18**: 63. 1933.

Type: San Miguel, Zacatecas, May 6, 1892, *Jones* s. n. (Pomona Coll. Herb. No. 82793).

Identified by Dr. M. Mathias and Dr. L. Constance as APIUM LEPTOPHYLLUM (Pers.) F. Muell. (ex Benth. Fl. Austral. **3**: 371. 1866).

Arracacia brandegei var. **sylvatica** Jones, Extracts from Contr. **18**: 61. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27071.

According to Dr. Mathias and Dr. Constance this is a recognizable variety of *A. brandegei* Coult. & Rose.

Arracacia tapalpae Jones, Extracts from Contr. **18**: 62. 1933.

Type: Ferrería de Tula, Tapalpa Mountains, Jalisco, May 28, 1892, *Jones* s. n. (Pomona Coll. Herb. No. 82990).

Identified by Dr. Mathias and Dr. Constance as TAUSCHIA NUDICAULIS Schlecht. (Linnaea **18**: 608. 1834).

SAPOTACEAE

Bumelia cuneifolia Jones, Extracts from Contr. **18**: 63. 1933, not Rudge (1805).

Type: Arroyo Undo Ranch, Loreto, Baja California, October 26, 1930, *Jones* 27850 (Pomona Coll. Herb. No. 190771).

Jones compares this species with "*B. reticulata* Brandeg.," which does not exist, so far as I am aware. His specimen is referable to BUMELIA OCCIDENTALIS Hemsl. (Biol. Centr. Amer. Bot. **2**: 298. 1881).

LOGANIACEAE

Buddleia corrugata Jones, Extracts from Contr. **18**: 56. 1933.

Type: Arroyo Undo Ranch, Loreto, Baja California, October 26, 1930, *Jones* 27361 (Pomona Coll. Herb. No. 191325).

This is almost surely a distinct species, of the general relationship of *B. scordioides* H. B. K., but with broader, differently shaped leaves. The two species differ also markedly in floral characters.

APOCYNACEAE

Stemmadenia rugosa Jones, Extracts from Contr. **18**: 67. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 21, 1930, *Jones* 27317 (Pomona Coll. Herb. No. 190846). In the original description the date is said to be November 17, but that the date on the label is correct is shown by Jones' account of his 1930 collecting trip, for under the entry for November 21 (*op. cit.* 116) he mentions collecting the "Apocynaceous" tree.

This is one of the arborescent species of morning-glories, IPOMOEA INTRAPILOSA Rose (Gard. & For. **7**: 367. 1894), of the family Convolvulaceae.

ASCLEPIADACEAE

Gonolobus rotundus Jones, Extracts from Contr. **18**: 64. 1933.

Type: Mound Valley, Sierra Madre Mountains, Chihuahua, September 26, 1903, *Jones* s. n. (Pomona Coll. Herb. No. 76076).

This is probably MATELEA WOOTONII (Vail) Woodson (Ann. Mo. Bot. Gard. **28**: 231. 1941), which is based on *Vincetoxicum wootonii* Vail, known previously only from the type collection from Colonia García, Chihuahua. Miss Vail's material is in flower and Jones' in fruit; consequently I cannot be entirely certain of their identity. The leaves are similar, although those of Jones' plants are a good deal larger.

CONVOLVULACEAE [31]

Evolvulus ramulosus Jones, Contr. **15**: 149. 1929.

Type: Tepic, Nayarit, February 12, 1927, *Jones* 23135 (Pomona Coll. Herb. No. 162630).

This is EVOLVULUS ALSINOIDES L. var. ASCENDENS (House) van Ooststr. (Med. Bot. Mus. Herb. Rijksuniv. Utrecht **14**: 32. 1934). Jones cites only one collection, but there are three other collections labeled *E. ramulosus* in his herbarium. One of these bears the same number as the type but was collected February 14, 1927. It is *E. alsinoides* L. *sens. lat.* Another from La Barranca, Guadalajara (*Jones* 27422), is *E. alsinoides* var. *debilis* (H. B. K.) van Ooststr. The third specimen, from Orendain, Jalisco (*Jones* 27423), is *E. prostratus* B. L. Rob., which belongs to a different section of the genus. Van Ooststroom had seen no material of Jones' species. He does not place it in his monograph but merely quotes the original description.

Ipomoea acaponetensis Jones, Extracts from Contr. **18**: 65. 1933.

Type: Acaponeta, Nayarit, March 1, 1927, *Jones* 23247 (Pomona Coll. Herb. No. 190805). The date is erroneously given in the description as March 3.

This is IPOMOEA GLOBOSA (Llave & Lex.) Meisn. (in Mart. Fl. Bras. **7**: 220. 1869), of the subgenus *Quamoclit*, according to the treatment by House (Bull. Torrey Club **36**: 595–603. 1909). The distinctions between *I. globosa* and *Quamoclit vitifolia* (Cav.) G. Don are not entirely clear.

Ipomoea acaponetensis var. **perennis** Jones, Extracts from Contr. **18**: 65. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 23, 1930, *Jones* s. n. Not located.

This variety cannot be placed in the absence of the type. It is probably not conspecific with *I. acaponetensis*.

Ipomoea equitans Jones, Contr. **15**: 149. 1929.

Type: El Tigre Mine, Acaponeta, Nayarit, March 1, 1927, *Jones* 23139 (Pomona Coll. Herb. No. 162795).

This is the rare species IPOMOEA AMPLEXICAULIS Fernald (Bot. Gaz. **20**: 535. 1895), the type of which is also from Nayarit.

BORAGINACEAE

Coldenia loretensis Jones, Extracts from Contr. **18**: 65. 1933.

Type: Mountain east of Loreto, Baja California, October 17, 1930, *Jones* 27394 (Pomona Coll. Herb. No. 191210). Another sheet bearing the same number is marked as collected October 16.

Identified by Dr. I. M. Johnston as COLDENIA CUSPIDATA I. M. Johnst. (Proc. Calif. Acad. IV. **12**: 1137. 1924).

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[31] See also *Stemmadenia rugosa*, page 112.

Tournefortia tepicana Jones, Contr. **15**: 148. 1929.

Type: Acaponeta, Nayarit, February 26, 1927, *Jones* 23134 (Pomona Coll. Herb. No. 162218).

Identified by Dr. I. M. Johnston as TOURNEFORTIA HIRSUTISSIMA L. (Sp. Pl. 140. 1753).

VERBENACEAE [32]

Bouchea flabelliformis Jones, Extracts from Contr. **18**: 67. 1933.

Type: Triunfo, Baja California, October 6, 1930, *Jones* 27439 (Pomona Coll. Herb. No. 192762).

Recognized as a valid species by Dr. H. N. Moldenke in his monograph of the genus (Repert. Sp. Nov. Fedde **49**: 123. 1940).

LABIATAE

Hedeoma gracillima Jones, Contr. **15**: 150. 1929.

Type: San Blas, Sinaloa, January 28, 1927, *Jones* 22849.

Identified by Dr. C. Epling as SATUREJA BROWNEI (Swartz) Briq. (Mém. Soc. Phys. Hist. Nat. Genève **32**[2], No. 10: 16. 1897).

Hyptis decipiens Jones, Extracts from Contr. **18**: 53. 1933.

Type: Triunfo, Baja California, October 6, 1930, *Jones* 27299 (Pomona Coll. Herb. No. 191185).

According to Dr. Epling this is a valid species.

Monardella lagunensis Jones, Contr. **15**: 151. 1929.

Type: Laguna Mountains, Baja California, March 2, 1928, *Jones* 24180 (Pomona Coll. Herb. No. 162836).

According to Dr. Epling this is a valid species.

SCROPHULARIACEAE [33]

Galvesia sessilis Jones, Extracts from Contr. **18**: 51. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 21, 1930, *Jones* 27410.

This is LAMOUROUXIA CORDATA Schlecht. & Cham. (Linnaea **5**: 103. 1830).

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[32] See also *Viburnum deltoideum*, page 116.

[33] Text contributed by Dr. F. W. Pennell, who supplies also the following notes on species described by Jones in his Contribution No. 12.

Castilleja stenophylla Jones, Contr. **12**: 67. 1908 (as *Castilleia*).

Type: Round Valley, Sierra Madre Mountains, Chihuahua, altitude 7,000 feet, September 17, 1903, *Jones* 12147. This is marked "type" by Jones and was presumably collected at García or San Diego Valley, the two localities cited by him in the description.

This is a characteristic species of *Castilleja*, for which Jones' name is very appropriate.

Gerardia paniculata Jones, Contr. **12**: 66. 1908.

Type: Marsh Lake, Sierra Madre Mountains, Chihuahua, September 19, 1903, *Jones* s. n. (Pomona Coll. Herb. No. 43415).

This is excellent GERARDIA PEDUNCULARIS Benth. (Comp. Bot. Mag. Hook. **1**: 209. 1836).

Penstemon flaviflorus Jones, Contr. **12**: 66. 1908; **15**: 124. 1929.

Type: Colonia Juárez, Sierra Madre Mountains, Chihuahua, altitude 6,000 feet, September 12, 1903, *Jones* s. n. (Pomona Coll. Herb. No. 42772).

This is a yellow-flowered form of the scarlet-flowered *P. barbatus* and may be known as **Penstemon barbatus** (Cav.) Roth f. **flaviflorus** (Jones) Pennell, comb. nov. Such a color variant may occur anywhere in the range of the species, although I do not recall seeing it before.

Herpestis macrantha Jones, Extracts from Contr. **18**: 51. 1933.

Type: Colonia Juárez, Chihuahua, September 12, 1903, *Jones* s. n. (Pomona Coll. Herb. No. 43627).

This is a widespread species of the Mexican Plateau, PAGESIA VANDELLIOIDES (H.B.K.) Pennell (Not. Nat. Acad. Phila. **43**: 2. 1940), which is based on *Herpestis vandellioides* H.B.K.

Pedicularis tepicana Jones, Contr. **15**: 150. 1929.

Type: Tepic, Nayarit, February 10, 1927, *Jones* 23211 (Pomona Coll. Herb. No. 162136).

This may be known as **Lamourouxia tepicana** (Jones) Pennell, comb. nov. It is apparently distinguishable from *L. multifida* H.B.K. by its shorter and less dissected leaves, its shorter inflorescences that terminate the more stiffly branched stems, and the smaller seeds, 0.5 mm. rather than 1 mm. long.

ACANTHACEAE [34]

Anisacanthus glaberrimus Jones, Contr. **15**: 151. 1929.

Type: El Tigre Mine, Acaponeta, Nayarit, March 1, 1927, *Jones* 22976 (Pomona Coll. Herb. No. 162104). *Jones* 23266 and 23198 are the same species.

A reduction to "?*Odontonema* sp." was made by Hagen (Ann. Mo. Bot. Gard. **28**: 402. 1941). This is ODONTONEMA CALLISTACHYUM (Schlecht. & Cham.) Kuntze (Rev. Gen. Pl. **2**: 494. 1891).

Beloperone intermedia Jones, Extracts from Contr. **18**: 66. 1933.

Type: Cayuca Ranch, Loreto, Baja California, October 23, 1930, *Jones* 27436 (Pomona Coll. Herb. No. 191323).

This is JUSTICIA PALMERI Rose (Contr. U. S. Nat. Herb. **1**: 75. 1890).

Ixtlania acicularis Jones, Contr. **15**: 151. 1929.

Type: Ixtlán, Nayarit, February 19, 1927, *Jones* 23534 (Pomona Coll. Herb. No. 162185). Isotype in the herbarium of the Missouri Botanical Garden.

The new genus *Ixtlania* seems to be valid. It is probably closest to *Beloperone* but differs in its irregular calyx, the posterior segment being much smaller than the other four. The pollen grains are of the "*knötchenpollen*" type characteristic of most of the subfamily Justicieae. As in *Beloperone*, the anthers are 2-celled (not 1-celled as stated by Jones), the cells being obliquely attached to a fairly broad connective and partially superposed. The lower cell is definitely spurred.

Because of its similar inflorescence, *Ixtlania* bears a close superficial resemblance to *Chaetochlamys umbrosus* Nees, of South America. The latter species, however, has a regular 4-parted calyx, and the superposed anther cells are very distantly attached.

Ruellia megacantha Jones, Extracts from Contr. **18**: 66. 1933.

Type: La Barranca, Guadalajara, Jalisco, November 25, 1930, *Jones* 27387 (Pomona Coll. Herb. No. 191094).

This is RUELLIA HOOKERIANA (Nees) Hemsl. (Biol. Centr. Amer. Bot. **2**: 505. 1882).

RUBIACEAE [35]

Borreria lagunensis Jones, Extracts from Contr. **18**: 67. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* 27124 (Pomona Coll. Herb. No. 191909).

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[34] Text contributed by E. C. Leonard.

[35] **Galium nitens** Jones, Contr. **15**: 153. 1929.

Type: Nogales, Ariz., October 23, 1926, *Jones* 22352 (Pomona Coll. Herb. No. 162116).

This is GALIUM MICROPHYLLUM A. Gray (Pl. Wright. **1**: 80. 1852). Jones' species is overlooked both in Kearney and Peebles' "Flowering Plants and Ferns of Arizona" and in Tidestrom and Kittell's "Flora of Arizona and New Mexico."

This is MITRACARPUS SCHIZANGIUM DC. (Prodr. **4**: 572. 1830).

Spermacoce jaliscensis Jones, Extracts from Contr. **18**: 67. 1933.

Type: Orendain, Jalisco, November 27, 1930, *Jones* 27118 (Pomona Coll. Herb. No. 191056).

This is BORRERIA HAENKEANA DC. (Prodr. **4**: 547. 1830), at least according to the usual interpretation. The genus *Borreria* is badly in need of revision.

PLANTAGINACEAE

Plantago hirtella var. **annua** Jones, Contr. **15**: 132. 1929.

Type: Laguna Mountains, Baja California, March 2, 1928, *Jones* 24403 (Pomona Coll. Herb. No. 162805).

This is PLANTAGO VIRGINICA L. (Sp. Pl. 113. 1753). The specimen is in flower only. The ovules are two only, and so it cannot be *P. hirtella*. In the leaves, bracts, and sepals, it is entirely typical of *P. virginica*, which has not been found previously in Baja California but which has been known from other parts of Mexico.

CAPRIFOLIACEAE

Viburnum deltoideum Jones, Extracts from Contr. **18**: 68. 1933.

Type: San José del Cabo, Baja California, September 14, 1930, *Jones* 27306 (Pomona Coll. Herb. No. 190842).

Identified by Dr. H. N. Moldenke as CLERODENDRUM FRAGRANS var. PLENIFLORUM Schauer (in DC. Prodr. **11**: 666. 1847), of the family Verbenaceae.

CAMPANULACEAE

Wahlenbergia filipes Jones, Extracts from Contr. **18**: 66. 1933.

Type: Orendain, Jalisco, November 27, 1930, *Jones* 27322. Not located.

The genus *Wahlenbergia* is not known to occur naturally in North America. The description is poor and undetailed but suggests vaguely *Diastatea micrantha* (H. B. K.) McVaugh (*Lobelia micrantha* H. B. K.). Whether this is correct can be ascertained only by examination of authentic material.

LOBELIACEAE

Lobelia amabilis Jones, Extracts from Contr. **18**: 68. 1933.

Type: The Laguna, Laguna Mountains, Baja California, September 22, 1930, *Jones* s. n. (Pomona Coll. Herb. No. 191014).

Identified by Dr. R. McVaugh as HETEROTOMA AURITA T. S. Brandeg. (Proc. Calif. Acad. II. **3**: 149. 1891).

Lobelia cotensis Jones, Contr. **15**: 152. 1929.

Type: Cota Ranch, 14 miles east of Todos Santos, Baja California, February 21, 1928, *Jones* 24147 (Pomona Coll. Herb. No. 162690).

Identified by Dr. R. McVaugh as HETEROTOMA AURITA T. S. Brandeg. (Proc. Calif. Acad. II. **3**: 149. 1891).

Lobelia loretensis Jones, Extracts from Contr. **18**: 68. 1933.

Type: Primera Agua, near Loreto, Baja California, October 19, 1930, *Jones* 27279 (Pomona Coll. Herb. No. 191445). In the description the date is erroneously given as October 26.

Identified by Dr. R. McVaugh as LOBELIA LAXIFLORA var. ANGUSTIFOLIA A. DC. (Prodr. **7**: 383. 1839).

ASTERACEAE DESCRIBED FROM MEXICO AND THE SOUTHWESTERN UNITED STATES BY M. E. JONES, 1908–1935

By S. F. Blake

INTRODUCTION

Marcus E. Jones was for more than half a century one of the best-known field botanists of the western United States. In fact, if the extent of his work in both years and territory and the amount of good botanical material he accumulated are taken into consideration, he may fairly be called the leading western collector of his time. For most of his life his financial resources were far from ample, and much of his botanical exploration had to be done in spare time in connection with the practical work in field geology which provided his main support. He was a man of intense individuality and extreme independence of mind, given to unsparing criticism of botanists whose views did not agree with his own. These criticisms, it must be admitted, were often well founded, but the unnecessarily caustic way in which they were expressed lessened their effectiveness, and his own carelessness in both observation and description invited equally severe retort. Such replies, however, were surprisingly few, possibly owing to prudence on the part of those who might have been expected to make them. An interesting sketch of his life and work by his daughter, Mrs. Mabel Jones Broaddus, is given on pages 152–157 of the eighteenth number of his "Contributions to Western Botany," in the part published after his death, and there is additional information in a biographical sketch by Thomas C. Adams.[1]

Although Jones collected from British Columbia to Baja California and Mexico, the main field of his work and his greatest interest lay in the flora of the Great Basin of Nevada and Utah. He brought together a vast amount of material, both specimens and notes, but never completed any comprehensive work on this area. His collections and manuscripts are now deposited in the herbarium of Pomona College at Claremont, Calif., which purchased them some years before his death.

His first botanical publication, apparently, aside from a sales list of his Colorado collection of 1878 which I have not seen, and perhaps another similar list in 1879, was a short paper entit ed "Notes from Colorado," published in the Botanical Gazette for December 1879 (**4**: 247–248). His first described new species, *Gilia scopulorum*, was published in the Bulletin of the Torrey Botanical Club for June 1881

[1] Proc. Utah Acad. Sci., Arts and Lett. **15**: 11–13. 1938.

(8: 70). Edward Lee Greene (1843–1915), after publishing 17 earlier short notes or papers [2] on the botany of the central and western United States, beginning in 1869, had published his own first new species, *Asclepias uncialis*, just a year earlier (Botanical Gazette **5**: 64, number for June 1880). During the next two or three years both authors published a number of short papers in both these periodicals; Greene had new species in both journals, but Jones only in the Torrey Bulletin.

At that time Asa Gray, the acknowledged leader of American botany, already 70 years old, was striving to complete his "Synoptical Flora of North America" as well as to handle, with the assistance of Sereno Watson, the mass of new material from the western States and Mexico that came to the Gray Herbarium. Gray's facilities for herbarium work, as regards both specimens and library, were of course vastly superior to those of either Greene or Jones, and his abilities in dissection and technical description equally so. It were probably no exaggeration to say that neither Greene nor Jones ever made a proper dissection or accurate description of any at all complicated floral structure. On the other hand, both men had a knowledge of western plants as they grew that was denied to Gray. The field of North American systematic botany had been his for so long that he did not welcome the advent of younger men with different points of view, and more or less open dissension arose.

Gray's influence with the editors of scientific journals was naturally powerful, and Jones believed that it was used to block the publication of his own papers and those of Greene describing new species unless they had first received Gray's approval.[3] It seems more likely, however, that Dr. J. M. Coulter was the moving spirit in this matter. Unpublished letters of Coulter to Gray and Sereno Watson in 1882 and 1883, which A. D. Rodgers, 3d, has kindly shown to me, make it clear that he had himself closed the pages of the Botanical Gazette to them, or at least to Jones, and had sought to enlist Watson's assistance in inducing the editors of the Torrey Bulletin to do the same. C. C. Parry, also, wrote to the editors of both journals in a similar vein. Whatever the exact source of the influence exerted may have been, it was effective. Jones' last paper in the Botanical Gazette was published in the number for August 1883, and in the Bulletin of the Torrey Botanical Club in that for June 1883; he never again published in either periodical. His paper describing six new species in the

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[2] See Ellen D. Kistler, Bibliography of the botanical writings of Edward Lee Greene. Madroño **3**: 328–348. 1936.

[3] See Jones, Contr. West. Bot. **14**:49–50. 1912. I have not been able to find in the pages of the Botanical Gazette or Bulletin of the Torrey Botanical Club the alleged editorial announcement to which Jones refers.

American Naturalist for August and September 1883 was apparently his last publication until after Gray's death in 1888. Greene published two short papers in the Botanical Gazette in 1883 and one in 1884, and none thereafter until 1897. He had three papers in the Bulletin of the Torrey Botanical Club in 1883, and none again until 1886, when he once more began to publish new species in this journal. His papers in 1884 and 1885 appeared mostly in the Bulletin of the California Academy of Sciences. In 1887 he began the issue of Pittonia, and in 1893 W. L. Jepson founded the journal Erythea. In these two serials and in his own Leaflets of Botanical Observation and Criticism (begun in 1903) most of Greene's subsequent writings appeared.

The first of Jones' Contributions to Western Botany appeared in Zoe in 1891, although this title was not adopted until the third of the series, and his other Contributions through No. 9 appeared either in this journal or in the Proceedings of the California Academy of Sciences except for No. 8, which was printed privately in 1898. The remaining numbers (10–18) were privately published by Jones, and Nos. 12–18 (except pp. 132–157 of No. 18) were put in type and printed by his own hands on a small press in his home. The complete freedom from censorship thus obtained must have been a source of satisfaction to him, if not to others, but the typographical appearance of his work and, as time went on and his type became worn, even its legibility suffered in consequence.

The bulk of Jones' published work, and much the most useful part of it, related to the botany of the Great Basin, with which he had a practical acquaintance of many years' standing. He did far more collecting than any other botanist in this area, by preference in out-of-the-way places (correspondingly difficult to locate on the map),[4] and discovered a considerable number of very distinct new species. The results of his Mexican work were much less fortunate. He made a number of trips to northern Baja California, from 1882 to 1927. His other Mexican trips were in 1892, when his collecting was done principally in Zacatecas, Colima, and Jalisco; in 1903, when he botanized rather extensively in Chihuahua; in 1926, in Sonora, Sinaloa, and southern Baja California; in 1927 (January to March), in Sonora, Sinaloa, and Nayarit (formerly Tepic); early in 1928, in southern Baja California; in 1930, when he collected the bulk of his supposedly new Mexican species, in Jalisco and in southern Baja California; and in 1932, when he spent one day (March 25) on an automobile trip from Laredo, Tex.,to Sabinas Hidalgo, Nuevo Leó̱n (Jones' "Sabinal"), in

[4] A detailed chronological account of his botanical itineraries through 1919 was prepared by Jones, and typewritten copies (52 pp.), with the title "An Account of the Botanical Collecting of Marcus E. Jones during the Years 1875 to 1919," have been deposited by Dr. Munz at the California Academy of Sciences, Gray Herbarium, and U. S. National Herbarium, as well as at Pomona College.

company with V. L. Cory and V. J. Shiner.[5] Jones (Contr. **18:** 141) took occasion to criticize Pringle as a "poor field botanist," because he himself got so many new species during a short stay in Pringle's own favorite collecting ground in Jalisco. It is not necessary to de-

[5] At several places in his published writings, Jones gave more or less detailed itineraries of his collecting trips and briefer notes on localities. Those relating to Mexican trips are as follows: Contr. **15:** 76–77 (1882, 1892, 1903, 1923–27 trips), 80–95 (1926–28 trips), 96–123 (1926–27 trips); **17:** 3–6 (1882 trip), 13 (1926–28 trips); **18:** 22–23 (Baja California localities of 1930), 86–119 (1930 trip).

As several of Jones' principal collecting localities in Chihuahua are not to be found on the ordinary map, it may be well to place on record what I have been able to discover regarding their exact location. The following quotation from his typewritten journal of botanical collecting (p. 43), referred to above, relates to his Chihuahua trip: "Then I went to Deming and the Floritas on the 7th [of Sept., 1903] and went to El Paso. I took the train for Dublan [ca. lat. 30°25′ N., long. 107°55′ W.] and reached Colonia Juarez on the 11th. botanizing at Sapio on the way on the 10th. I hired a team and wagon and went up on to the Sierra Madres going up Soldier Canyon on the 16th., was in Round Valley and Hop Valley on the 17th. and Mound Valley the 18th., going through Garcia I reached Chuichupa the 21st. and botanized there several days making it headquarters. From there I took a three days trip to Guayanopa Canyon and back. The 26th. I was in Largo Canyon and Soldier Canyon and back to Colonia Juarez. Thence I went to El Paso botanizing at Sabinal on the way about the 29th. I spent a day at Mesilla Park. This trip netted about 40 new species."

CHIHUAHUA: Colonia Juarez (Juárez of Mexican maps). About lat. 30°18′ N., long. 108°5′ W. Dublán is 20 km. northeast of it, and García about 45 km. southwest of it.—Chuichupa (Chuhuichupa or Chahuichupa of official Mexican maps). About lat. 29°37′ N., long. 108°22′ W., about 40 km. almost due south of García.—Guayanopa Canyon (Guaynopa of Mexican maps). About 25 km. south-southwest of Chuhuichupa and about 10 km. east of the Sonora boundary.—Hop Valley (Arroyo de Hop Valley of Mexican maps). On wagon road from Juárez to García, about 7 km. northeast of García.—Marsh Lake. Jones collected here at 7,000 feet on September 19. Not located, but from date evidently between Hop Valley and García.—Meadow Valley. Jones collected here on September 17. Not located, but evidently close to Hop Valley, where he also collected on September 17.—Mound Valley. Jones collected here at 7,000 feet on September 18. Not located on the more recent maps, but shown on an unofficial map of 1916 at or near the Moctezuma of the official map, about 12 km. south of García. Jones speaks of it (Contr. **12:** 15) as near Chuichupa.—Round Valley. Jones collected here September 17. Not located, but evidently near Hop Valley.—Sabinal. The railroad station of this name is at lat. 30°55′ N., long. 107°30′ W., the town itself about 12 km. west of this.—San Diego Canyon. The wagon road to García passes through this canyon about 10 miles south and a little west of Juárez.—San Pedro Canyon. Not located, but evidently near Soldier Canyon, where he collected the same day (September 16).—Sapio. Not located. On his southward trip, Jones collected here September 10, and reached Colonia Juárez the next day.—Soldier Canyon (Arroyo Soldado). On wagon road from Juárez to García, about 16 km. northeast of García. (The data in this paragraph taken mostly from the official map of Chihuahua, scale 1/400,000, issued in 1927 by the Secretaría de Agricultura y Fomento. San Diego Canyon, not shown on this map, is given on sheet 5–II–(L), published in 1911, of the "Carta de la República Mexicana á la 100,000a.")

fend Pringle's title to pre-eminence as a collector, but it may be noted, as bearing on Jones' ability to identify his own material from a region with which he was not familiar, that every one of the 25 allegedly new species of Asteraceae he described from his 1930 collection in Jalisco is a synonym of an older species, as is also the single species from his 1892 collection, and that 12 of the 26 were described by him under wrong genera, in 2 cases in wrong tribes, in 6 others in wrong subtribes.

The present paper deals with the species of Asteraceae described as new by Jones from 1908 through 1935, in Nos. 12, 15, 17, and 18 of his Contributions to Western Botany. It thus includes all the new species he described from Mexico and the much smaller number he described from Texas, New Mexico, and Arizona. Very few of these have been adequately dealt with in botanical literature since they were originally published, although his new species from Utah, Nevada, California, Montana, and elsewhere are practically all disposed of for better or worse in the various manuals and floras of those regions. One new genus, 63 new species, and 3 new varieties proposed by Jones are discussed in this paper, as well as 10 new names and combinations. Of these, 5 species and 1 variety are retained as valid, and the single genus, 58 species, and 2 varieties, as well as all the new names and combinations except one, are placed in synonymy. Of the 63 new species described, good and bad, 28 were placed in wrong genera, and of these 3 were in wrong tribes and 10 others in wrong subtribes. The species have been grouped in the following pages under the tribes to which belong the genera to which they were referred in Jones' original descriptions, the genera and species under each tribe being arranged alphabetically under the names given them by Jones.

This paper owes its completeness to the kindness of Dr. Philip A. Munz, of Pomona College, in lending material, in part directly, in part through C. V. Morton, of the United States National Herbarium. Acknowledgment should also be made of assistance derived from a manuscript treatment of most of the Eupatorieae prepared by the late Dr. B. L. Robinson and made available through the kindness of C. A. Weatherby. The identification of Jones' types is often not an easy matter, for he was careless in labeling and there are frequent discrepancies in dates, collecting numbers, and localities between the data on his mounted sheets and in his published papers. The recognition of the types of the species described from Chihuahua in his 1908 Contribution (No. 12) is especially difficult, since he seems to have left no names associated even with his types in much if not all of the material he collected there in 1903 and described in this paper. Fortunately the descriptions in this paper are for the most part comparatively satisfactory, so that it is possible to associate them with confidence in almost every case with the material laboriously hunted out by Dr. Munz.

Although the term "lectotype" has been used in the following pages only when there was occasion to select a type from among two or more sheets of the same or different collections cited by Jones, there can be little doubt that many others among the sheets here referred to as types (i. e., holotypes) should in strictness be regarded as lectotypes. Jones collected most of his specimens in quantity and distributed them widely by sale. A large part of his herbarium was unmounted at the time of its purchase by Pomona College in 1923, and many unmounted duplicates from it have since been distributed. A set of all the plants he collected after 1923 was deposited at Pomona, but it cannot be assumed that any given sheet of such specimens is therefore a holotype of one of his species.[6] I am informed by one who knew him that it was his custom to spread out all his material when describing a new species and to draw up his account from the whole collection.[7] In some few cases it is even possible that by some error all the material of a given collection was distributed and none kept by Jones. This seems to be the case in *Verbesina cayucensis*, of which there is a sheet of the type collection in the United States National Herbarium, although Dr. Munz has been unable to discover one at Pomona. For convenience's sake it is certainly desirable in general to regard the specimens retained in the Jones Herbarium as it was mounted at Pomona as the effective types, unless they disagree too strongly with his descriptions; and, in view of the average quality of these descriptions, such discrepancies must needs be visible to the naked eye, although not necessarily of great botanical significance.

All of Jones' privately published Contributions to Western Botany except the eighteenth were issued and distributed in only one form, and there is no evident reason to question the dates of issue printed on them. Of his last Contribution (No. 18), however, before it was published as a whole he distributed some copies of pages 25–85 in a specially printed paper cover bearing the following title: "Extracts from Contributions to Western Botany No. 18 by Marcus E. Jones A. M. Issued at Claremont, Cal., Aug. 23, 1933." The copy at the

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[6] Even though Jones later stated: "The types of my 1926, 1928, 1930, and 1931 collections went to the College by agreement because it helped finance the trips . . ." Contr. **18**: 131. 1935.

[7] The following paragraph, taken from a letter from Dr. Munz (September 22, 1942), may be put on record in this connection: "Jones never had a modern type concept. When we first began work on his herbarium, we would find for his earlier species perhaps two or three different collections not necessarily on same day or exactly same place, labeled 'type set'; often there would be two or three sheets of same collection number. My general feeling is that in his later years a type was a given collection number; the description was drawn up from a suite of specimens, usually unmounted; these were then distributed to subscribers and supposedly at least one retained here; often duplicates were retained here. But after the distribution and mounting, no one could say which of the specimens or sheets was really the type. His idea was to keep the best and most representative material in his own collection . . ."

Missouri Botanical Garden, as Dr. Greenman informs me, was received September 6, 1933, and those at the Gray Herbarium and the U. S. National Herbarium on September 7. A copy sent to Mrs. N. Floy Bracelin, of the University of California, was mailed sometime before August 27; the one at the New York Botanical Garden (containing pages 1–85) was received at the library October 20, 1933, having been sent to Dr. Merrill at or about the same time that a copy was sent to Mrs. Bracelin. The dates of receipt of the Field Museum copy and Miss Eastwood's private copy are not recorded. It is not in the libraries of the University of California or Stanford University.

It appears that a single copy of the "Extracts" containing additional pages was sent out by Jones. Mrs. Bracelin, with whom Jones was in frequent correspondence at that time, has kindly sent me extracts from his letters bearing on the printing and distribution of Contribution 18. In a letter dated August 27, 1933, he wrote: "Last week I sent you a complete copy to date of Contribution No. 18 and you are the only one to whom I have sent one that is complete." The copy received by Mrs. Bracelin, however, contained only pages 25–85. In reply to her inquiry regarding the missing pages he wrote, under date of September 13: "I intended sending you a complete copy of Cont. No. 18 and made out one as I wanted it to be and thought I had mailed it to you, but it appears that I sent it to Merrill instead, and so I am now putting up another to add to what I sent you." The copy first referred to, now at the New York Botanical Garden, has a paper cover bearing the same title as the other copies just mentioned, but it includes pages 1–85 instead of only 25–85 (Dr. H. W. Rickett, *in litt.*).

Copies of additional unbound pages of Contribution No. 18 were sent to two individuals before the complete work was issued in April 1935. Mrs. Bracelin informs me that Jones sent her pages 1 to 125 on dates not now ascertainable, and Mr. Weatherby writes that loose sheets up to and including page 131 were sent for examination to Dr. B. L. Robinson by Jones' daughter, Mrs. Mabel J. Broaddus, in November 1934. According to information furnished by Mrs. Bracelin taken from letters addressed to her by Jones, he was working at the printing of it as early as August 24, 1932. On July 25, 1933, he was at page 76; on December 22, at p. 107; and on April 23, 1934, at page 126. The statement by Mrs. Broaddus, in a circular advertising his publications, that "pages 1–85 had been printed and distributed to a selected list of botanists August 23, 1933," was evidently based on a misunderstanding. The statement by the late Ethel Crum (Madroño **3**: 179. 1935) that "pages 30 to 85 of Number 18 appeared August 23, 1933; pages 86 to 131 were printed and a limited number of copies distributed by Mr. Jones before his death on June 3, 1934" is definitely in error in regard to the number of pages making up the "Extracts,"

and essentially so also in regard to pages 86–131, at least in its implication regarding the status of these pages.

Determination of the effective date of issue of Contribution No. 18 is of some significance, since none of the 3 new genera, 141 new species, and 9 new varieties in the complete work are provided with a Latin diagnosis or description, except for 4 new species of *Salvia* contributed by Dr. Carl Epling. Under article 38 of the International Rules of Botanical Nomenclature (ed. 3, 1935), a Latin diagnosis or description is obligatory for valid publication beginning January 1, 1935. Although Jones' distribution of bound copies of pages 25–85 to an unl determined but certainly not large number of botanists and botanica-institutions is not to be commended as a method of publication, it may be taken as effective under the circumstances. The mailing of one copy of pages 1–24, bound with pages 25–85, in August 1933, and of two copies in unbound form subsequently (one at an unknown date, the other in November 1934), cannot be so regarded; and the sending of pages 86–125 and 86–131 in unbound form to two individuals likewise does not constitute publication. The 2 new genera (*Mollugophytum* [by typographical error *Mollugophytnm*] and *Hutchinsonia*), 132 new species (including Epling's *Salvia*), and 7 new varieties described on pages 25 to 85 (the "Extracts") are therefore validly published under the International Rules, but the single genus (*Nissoloides*), 9 species, and 2 varieties on pages 20–24, 125, and 135 (issued in April 1935) are not.

SYSTEMATIC TREATMENT

VERNONIEAE

Vernonia camporum Jones, Extracts from Contr. **18**: 69. 1933.

Jones 27696, Orendain, Jalisco, November 27, 1930. This is VERNONIA SERRATULOIDES H.B.K.

Vernonia floccosa Jones, Extracts from Contr. **18**: 69. 1933.

Jones 27700, La Barranca, Guadalajara, Jalisco, November 23, 1930. This is BOLANOSA COULTERI A. Gray. Jones' name is preoccupied by *V. floccosa* Gardn. (1846).

Vernonia viarum Jones, Extracts from Contr. **18**: 69. 1933.

Jones 288, Chiquilistan, Jalisco, May 30, 1892. This specimen was correctly identified by Dr. B. L. Robinson, who is quoted by Jones, as VERNONIA DEPPEANA Less., but Jones nevertheless proceeded to describe it as a new species.

EUPATORIEAE

Brickellia cayucensis Jones, Extracts from Contr. **18**: 71. 1933.

Jones 27818, Cayuca Ranch, Loreto, Baja California, October 23, 1930. "An isotype sheet of this [in Gray Herbarium], bearing the no. 27818 and data identical with those given in Jones' brief character, bears three specimens. The first is *B. glabrata* (Rose) Robinson, which with its rather sharply toothed leaves of relatively small size was presumably the element that suggested to Jones relationship to *B. coulteri* Gray. The second element is *B. macromera* Robinson, which

has the crenate-serrate leaves 1–1.5 inches long and petioles 1 cm. long [of Jones' description]. The third plant is malvaceous." (B. L. Robinson.) To this it may be added that the sheet in the Pomona College Herbarium (No. 193142), which should be taken as the type, bears four stems, of which one has been identified by Dr. Robinson as *B. macromera* and three as *B. glabrata.* Jones' vague description applies about equally well to either species except for his characterization of the leaves as 1 to 1.5 inches long and papillate-roughened, by which he presumably meant hispidulous, as the leaves are in the specimen of *B. macromera,* whereas they are smaller and quite glabrous and smooth in *B. glabrata.* In view of this distinctive item of his description I designate as lectotype of *B. cayucensis* the single stem of B. MACROMERA Robinson on sheet 193142 in the Pomona College Herbarium, despite the numerical preponderance of specimens of *B. glabrata.* Jones' name would become a synonym whichever way it were typified.

Brickellia diffusa Jones, Extracts from Contr. **18**: 71. 1933.

Jones 27821, Guadalajara, Jalisco, November 24, 1930. "Jones' *B. diffusa,* known from description and an isotype, is B. PANICULATA (Mill.) Robinson." (B. L. Robinson.) Jones' name is a homonym of *B. diffusa* (Vahl) Gray, the commonest and most widely distributed species of the genus. Material not seen by me.

Brickellia megaphylla Jones, Extracts from Contr. **18**: 71. 1933.

Jones "27814, Arroyo Undo [Ranch], [Loreto, Baja California,] Oct. 23 and 26, 1930." Two sheets sent from the Pomona College Herbarium, one (No. 192947) labeled No. 27814, Arroyo Undo Ranch, Loreto, October 26, 1930; the other (No. 192768), labeled Cayuca Ranch, Loreto, October 23, 1930, without collector's number. They are clearly identical specifically, although the leaves of the second are more sharply toothed; the first, in view of the published locality, is here selected as lectotype.

This species was regarded by Dr. Robinson, after examination of an isotype in the Gray Herbarium, as apparently distinct from but suspiciously close to *B. hastata* Benth., of the western side of Baja California. Of the two sheets before me, the one designated above as lectotype bears two branches, one a poorly developed tip with small leaves only 4–5 cm. long, some of which are decidedly triangular-hastate, the other with well-developed leaves with blades 7.5 to 9 cm. long and 5 to 7 cm. wide, decidedly suggestive of those of well-developed *B. grandiflora* in outline and toothing and with no more hastation than is frequent in that species, but with the apex blunt. The specimen on the other sheet has leaves similar to these larger leaves but with sharper and more jagged toothing toward the base. If the few specimens of *B. hastata* so far known represent the normal leaf form of that species, the two are quite distinct. A Latin description prepared by Dr. Robinson, slightly modified to include characters shown by this more ample material, may be given here:

"Fruticosa 1.2–2.4 m. alta tenuiter griseo-velutina; foliis (supremis aliquando exceptis) oppositis graciliter petiolatis subdeltoideo-ovatis ad apicem rotundatum angustum acuminatis grosse crenatis vel basi argute dentatis 7–9 cm. longis 5–7 cm. latis membranaceis utrinque praecipue in venis paginae inferioris griseo-pilosulis subtus paullo pallidioribus et glandulis lucidis adspersis basi leviter cordatis 3-nervatis, petiolis 2–3.5 cm. longis; corymbis amplis convexis subfastigiatim ramosis; capitulis graciliter pedicellatis 10–12-floris ca. 1 cm. longis 4 mm. diametro; involucri squamis ca. 17 angustis viridi-striatis laxe imbricatis valde inaequalibus omnibus acutatis; corollis albis 5.5 mm. longis; achaeniis graciliter cylindratis 3.5 mm. longis brunnescentibus sursum griseo-villosulis. BAJA CALIFORNIA: Arroyo Undo Ranch, Loreto, Oct. 26, 1930, *Marcus E. Jones* 27814."

Brickellia shineri Jones, Contr. **18**: 22. 1935.

Jones 29411, "on the Sabino river, Mex., 80 miles west of Laredo, Tex., March 26, 1932." The type (Pomona Coll. Herb. No. 200174) bears a printed label giving the locality as Sabinal, Mexico. V. L. Cory, who, as well as V. J. Shiner, accompanied Jones on the trip on which this plant was collected, informs me that the correct date is March 25 and the correct locality Ojo de Agua, about 2½ miles out of Sabinas Hidalgo, Nuevo León, at a point where the Río Sabinas emerges from the mountains. The plant is EUPATORIUM PARRYI A. Gray, a rather rare species of northeastern Mexico and western Texas. Jones' description is comparatively full and includes mention of the 5-angled achenes, which place the species in *Eupatorium* rather than in *Brickellia*, to which genus it bears a decided habital similarity. Jones' name is not validly published under the International Rules, since it is not accompanied by a Latin diagnosis.

Brickellia undonis Jones, Extracts from Contr. **18**: 71. 1933.

Jones 27822, Arroyo Undo Ranch, Loreto, Baja California, October 26, 1930. "An isotype of this, sent to the Gray Herbarium, proves to be B. MACROMERA Robinson." (B. L. Robinson.) I have examined the type (Pomona Coll. Herb. No. 192745).

Eupatorium arborescens Jones, Contr. **12**: 43. 1908.

Jones, Guayanopa Cañon, Sierra Madre Mountains, Chihuahua, 3,600 feet altitude, in the Tropical Life Zone, September 24, 1903. Referred to the synonymy of EUPATORIUM PALMERI A. Gray by Robinson in Standley, "Trees and Shrubs of Mexico" (Contr. U. S. Nat. Herb. **23**: 1448. 1925). Not seen by me.

Eupatorium megaphyllum Jones, Extracts from Contr. **18**: 70. 1933.

Jones 27808, La Barranca, Guadalajara, Jalisco, November 17, 1930. The type was examined by Dr. Robinson and identified as E. QUADRANGULARE DC. Jones' name is a homonym of *E. megaphyllum* Baker (in Mart. Fl. Bras. **6**[2]: 322. 1876).

Mikania anomala Jones, Extracts from Contr. **18**: 70. 1933.

Jones "27806, Guadalajara, [Jalisco,] Nov. 26, 1930." Three sheets, all with the name *Mikania anomala* n. sp. typewritten on the label, were identified by Dr. Robinson and are now before me. One, labeled No. 27806, Guadalajara, November 24, 1930, is *Piqueria trinervia* Cav. The second, labeled No. 27793 (the number in the hand of Munz, not Jones), Guadalajara, November 26, 1930, is the same species. The third, labeled No. 27807, La Barranca, Guadalajara, November 21, 1930, is *Eupatorium trinerve* Sch. Bip., and since it does not agree with Jones' description or data, it can be excluded from consideration. The name *Mikania anomala* must be referred to the synonymy of PIQUERIA TRINERVIA Cav. The specimen labeled 27806 does not agree with Jones' description, having narrowly lanceolate, distinctly serrate leaves, and comparatively few young heads grouped toward the tips of the three branches. The sheet of No. 27793, consisting mainly of a compound inflorescence over a foot long, with subentire, almost linear leaves, and mature heads, is undoubtedly the basis of Jones' description and is here selected as lectotype. The date of collection agrees with that given in the original description, also, and the citation of the number of the other collection may be regarded as merely one of many such errors in his paper.

Stevia bisecta Jones, Extracts from Contr. **18**: 70. 1933.

Jones "27800, Orendain, Jalisco, Nov. 27, 1930." "Of this species the type number cited was 27800, said to have been collected at Orendain, Jalisco, Nov. 27, 1930. Under No. 27805 a sheet of material with identical data is submitted which so closely agrees with Jones' description that it seems surely to represent the plant intended, though (possibly through clerical or typographical

error) the number was slightly altered. The plant is AGERATELLA PALMERI (Gray) Robinson, originally collected near Guadalajara nearly fifty years ago." (B. L. Robinson.) It may be added that the type in the Pomona College Herbarium (No. 192915) bears a specific name differing in its first syllable from the published one, and that the number on the label appears to have been altered from 27800 to 27805.

Stevia pulcherrima (Robinson) Jones, Extracts from Contr. **18**: 71. 1933.

"Jones expresses the opinion that this plant [BRICKELLIA PULCHERRIMA Robinson] is a *Stevia* and should be called *S. pulcherrima.* This view can scarcely be held by anyone who takes the trouble to note the imbricated involucre, 8–9-flowered heads, and capillary pappus. Jones incidentally states that I created for this plant a section 'Stevioideae,' doubtless a slip of his memory for Steviastrum." (B. L. Robinson.)

ASTEREAE

Aster madrensis Jones, Contr. **12**: 43. 1908.

"Also collected by me at Colonia Juarez, Chihuahua, Mex. The type is from San Diego Canon west of Juarez along streams in wet places, Sept., 1903, 6400 feet alt., in the Middle Temperate Life Zone." The type (Pomona Coll. Herb. No. 37620) is ASTER EXILIS Ell.

Baccharis squamulosa (A. Gray) Jones, Extracts from Contr. **18**: 71. 1933.

Jones states: "He [Robinson] also keeps up Gray's B[rickellia] squamulosa which is a pistillate Baccharis squamulosa." BRICKELLIA SQUAMULOSA A. Gray is, of course, a true *Brickellia*, bearing only a superficial resemblance to *Baccharis pteronioides* DC. (*B. ramulosa* (DC.) A. Gray), which is no doubt the plant Jones had in mind.

Conyza pulcherrima Jones, Contr. **12**: 47. 1908.

Jones, "Soldier Canon, Sierra Madre Mts., Chihuahua, Mex., Sept., 1903, at 6,000 feet alt., in the upper edge of the Lower Temperate Life Zone." The type (Pomona Coll. Herb. No. 40425), which bears on the label the specific name in the positive rather than the superlative degree, is CONYZA GNAPHALIOIDES H.B.K. The specimens are unusual in having the outer pappus composed of lacerate squamellae 0.5 mm. long, rather than of the usual short bristles.

Erigeron howardi Jones, Contr. **12**: 45. 1908.

Jones, "Colonia Juarez, Chihuahua, Mex., 6,000 feet alt., Sept., 1903, in the Middle Temperate Life Zone." A sheet (No. 37622) in the Pomona College Herbarium matches Jones' data and unusually careful description so well that I have no doubt it is actually the type, although it bears no name. The whole plant (stem, leaves, and involucre) is hispid-pilose, with spreading, more or less upcurved hairs with somewhat tuberculate bases, not strigose as described by Jones, and may be biennial rather than annual. It is closely related to *Achaetogeron linearifolius* S. Wats., of Hidalgo and the State of Mexico, differing in its annual or perhaps biennial (not perennial) root, dense and conspicuous, spreading or spreading-ascending (not sparse, inconspicuous, and appressed or subappressed) stem pubescence, and its shorter crown of squamellae (only 0.1 to 0.2 mm. long, less than half as long as the tube of the disk corollas; in *A. linearifolius* 0.4 to 0.5 mm. long, from half to essentially as long as the tube). It becomes **Achaetogeron howardi** (Jones) Blake. *Palmer* 351 (of 1896), from the vicinity of the city of Durango, belongs to the same species.

Erigeron sylvestris Jones, Contr. **12**: 44. 1908.

Jones, "open woods, Soldier Canon, Sierra Madre Mts., [Chihuahua,] Mex., Sept., 1903, 6500 feet alt., in the Middle Temperate Life Zone." No specimen

so labeled by Jones has been found, but a sheet (Pomona Coll. Herb. No. 39229) bearing the same data and agreeing perfectly with Jones' description is undoubtedly the type. The stem is pilose, with the hairs mostly spreading except in its upper part, where they become ascending or (on the peduncles) subappressed; the heads are 2.5 to 3 cm. wide, the rays about 100 (pink in bud, white at maturity) and the involucre about 3-seriate, slightly graduated, 4.5 mm. high, of linear acuminate greenish phyllaries spreading-pilose along the midline. The disk achenes are obovate, strongly compressed, 2-nerved, very sparsely puberulous on the sides, the pappus a minute fimbriate crown without bristles. It is a form of ACHAETOGERON PALMERI A. Gray with pubescence more spreading than usual, and is pretty well matched in this respect by *E. A. Goldman* 190a, from the Sierra Madre, Chihuahua, 65 miles southeast of Batopilas, about 7,000 feet altitude, which Miss Esther L. Larsen (now Mrs. Kenneth D. Doak) in her unpublished revision of *Achaetogeron* has referred to *A. palmeri*.

Erigeron tenuicaulis Jones, Contr. **12**: 44. 1908.

Jones, "on hillsides east of Hop Valley, Sierra Madre Mts., Chihuahua, Mex., 7,000 feet alt., in the Middle Temperate Life Zone, Sept., 1903." No material with corresponding data could be found by Dr. Munz. However, two sheets were sent (Pomona Coll. Herb. Nos. 39221, 39223), obviously belonging to one collection and labeled "Mesa, west of Soldier Canyon, Sierra Madre Mts., Chihuahua, Sept. 16, 1903, alt. 7,000 ft.," which agree so closely with Jones' rather careful description that I have little doubt that they are the actual collection cited and that the discrepancy in data is due merely to a different way of describing the locality. They are ACHAETOGERON AFFINIS A. Gray, and Jones' description, interpreted in the light of these specimens, agrees so well with that species that I have no hesitation in referring his name to its synonymy.

HELIANTHEAE

Aspilia grosseserrata Jones, Extracts from Contr. **18**: 84. 1933.

Jones 27778, "La Barranca, Guadalajara, [Jalisco,] November 17, 1930" (November 16 on the printed label). Jones' description is unusually inaccurate, but from its general correspondence I do not doubt that it was actually drawn from the sheet so labeled (by Munz) and so numbered, which is SIMSIA SANGUINEA A. Gray var. PALMERI (S. Wats.) Blake. The type of this came from Río Blanco, Jalisco, and it has been collected at Guadalajara by Pringle. The achenes in Jones' plant are glabrous and epappose, despite his description; he probably mistook split margins of disk pales for pappus.

Bebbia filifolia Jones, Extracts from Contr. **18**: 80. 1933.

Jones 27783, Cayuca Ranch, Loreto, Baja California, October 23, 1930. This is merely BEBBIA JUNCEA (Benth.) Greene, approaching the formal var. *aspera* Greene in having the leaves (but not the stem) hispidulous. The leaves, described by Jones as filiform, 3–5-parted, and 3 to 4 inches long, are actually linear or very narrowly linear-lanceolate, about 4 cm. long, entire or with one or two teeth or short lobes. On the young branches the leaves are sometimes alternate, and the resemblance between the leaves themselves and the branches on which they are borne has led to Jones' error.

Berlandiera macrophylla (A. Gray) Jones, Contr. **12**: 48. 1908.

Gray's concept of this plant, as BERLANDIERA LYRATA Benth. var. MACROPHYLLA A. Gray (Syn. Fl. N. Amer. **1**^{2}: 243. 1884), seems to me preferable to that of Jones.

Bidens barrancae Jones, Extracts from Contr. **18**: 82. 1933.

Jones 27757, La Barranca, Guadalajara, Jalisco, November 23, 1930. After examining the type, Dr. E. E. Sherff, in his monograph of *Bidens* (Field Mus.

Publ. Bot. **16**: 444, 446. 1937) referred Jones' species to BIDENS PILOSA L. var. BIMUCRONATA (Turcz.) O. E. Schulz f. ODORATA (Cav.) Sherff.

Bidens orendainae Jones, Extracts from Contr. **18**: 82. 1933.

Jones 27770, Orendain, Jalisco, November 27, 1930. This is referred by Sherff (*op. cit.* 456), after examination of the type, to BIDENS PILOSA var. CALCICOLA (Greenm.) Sherff.

Coreopsis diffusa Jones, Extracts from Contr. **18**: 73. 1933.

Jones 27720, La Barranca, Guadalajara, Jalisco, November 17, 1930. This is referred by Sherff, in his monograph of *Coreopsis* (Field Mus. Publ. Bot. **11**: 453. 1936), to CHRYSANTHELLUM MEXICANUM Greenm. (1903).

Coreopsis paludosa Jones, Contr. **12**: 46. 1908 (as *paludosus*).

Jones, "Marsh Lake, Sierra Madre Mts., Chihuahua, Mex., 7,000 feet alt., in the Tropical Life Zone, Sept., 1903." This is retained as a valid species by Sherff in his monograph of the genus (Field Mus. Publ. Bot. **11**: 434. 1936), although it is omitted from his key. Sherff cites in addition to the type (which I have not seen) a sheet in the Pomona College Herbarium collected by Jones at Meadow Valley in the Sierra Madre, Chihuahua, September 17, 1903. Another sheet (Pomona Coll. Herb. No. 30208), labeled as collected by Jones on mesa west of Hop Valley, Sierra Madre Mountains, Chihuahua, 7,000 feet, September 17, 1903, is evidently the same species, although its basal leaves are much smaller than those described by Jones and are entire. Two sheets in the U. S. National Herbarium collected by Dr. E. W. Nelson, one (*Nelson* 4783a) from the Sierra Madre, 30 miles north of Guanaceví, Durango, 8,000 to 9,000 feet, August 18, 1898, the other (No. 6104) from the Sierra Madre, Chihuahua, June–July 1899, belong to the same species.

Dyschoris Jones, Contr. **18**: 125. 1935; **Didymocoris** Jones, Contr. **18**: 127. 1935.

On page 127, after a discussion of the characters of the genus *Dicoria*, Jones continued, in a phrase suggestive of Rafinesque: "Had Gray known that there are 2 opposed bracts he might have called the genus Didymocoris, a better name." On page 125, in a similar vein, after discussing the change of name from the original *Dicoris* Torr. & Gray (in Emory, Notes Milit. Reconn. 143. 1848, without description or mention of species) to *Dicoria* Torr. & Gray (in Torrey, U. S. & Mex. Bound. Bot. 87.1859), he had stated: "It would have been better to leave the original name unchanged or to have called it dyschoris, false bug, which would have been better Greek, than to use a corrupt and an unclassical spelling for choris, bug." The name for bug in Greek is κόρις; there is no word χορις, and χωρίς is an adverb meaning separately; and the prefix δυς means bad or ill but not false. The two names unnecessarily made by Jones of course enter the synonymy of *Dicoria* and in my opinion are to be regarded as published in synonymy rather than as "provisional" or "alternative" names.

Eclipta pusilla Jones, Extracts from Contr. **18**: 70. 1933.

Jones 27739, Arroyo Undo Ranch, Loreto, Baja California, October 26, 1930. This is MELAMPODIUM CUPULATUM A. Gray, which apparently has not previously been recorded from Baja California although it is known from Sonora and Sinaloa. The five phyllaries are connate for more than half their length, very blunt, loosely hirsute, and provided with a narrow subscarious margin above.

Encelia anomala Jones, Extracts from Contr. **18**: 82. 1933.

Jones "27716, Arroyo Undo, Oct. 25, 1930." Three sheets representing this species are on loan from the Pomona College Herbarium. Two are numbered 27716 on the label but are from Cayuca Ranch, Loreto, October 23, 1930; one of

these is labeled *Encelia anomala* n. sp. (typewritten), the other bears an unpublished name (as a new species), also under *Encelia*. The third is numbered 27715, Arroyo Undo Ranch, Loreto, October 26, 1930, and carries the same unpublished specific name. Thus none agrees completely with the data as given by Jones. Fortunately, the selection of a type is a matter of no great importance, since all three sheets are clearly conspecific and are in fact HELIOPSIS PARVIFOLIA A. Gray. I designate the third sheet mentioned (Pomona Coll. Herb. No. 193731) as lectotype, since it is the only one from the locality cited, although its number (27715) and date do not agree. Since it is obviously impossible to select a type specimen with data agreeing in all respects with those given in the original description, it has seemed best to choose one that will preserve the type locality as published without change. Although apparently not previously reported from Baja California, *Heliopsis parvifolia* has been found there by several collectors but has been regarded as *H. buphthalmoides* (Jacq.) Dunal.

Encelia lineariloba Jones, Contr. **18**: 21. 1935.

Jones 29410, Laredo, Tex., March 23, 1932 (March 24 on the label). This is VIGUIERA STENOLOBA Blake (1918). Jones' name, included in that part of Contribution No. 18 published after December 31, 1934, is invalid under the International Rules, not being accompanied by a Latin diagnosis.

Franseria acerifolia Jones, Extracts from Contr. **18**: 78. 1933.

Jones 27765, Cayuca Ranch, Loreto, Baja California, October 23, 1930, and *Jones* 27764, Arroyo Undo Ranch, Loreto, October 26, 1930. Both collections are FRANSERIA ARBORESCENS T. S. Brandeg. The first, *Jones* 27765 (Pomona Coll. Herb. No. 193273), is designated as lectotype.

Galinsoga sphaerocephala Jones, Extracts from Contr. **18**: 79. 1933.

"Galinsoga Ruiz and Pav. Whether there is more than the one species here I do not know. The ray flowers are white and very short; the pappus is of several oblong scales variously lacerate and pointed. My species, sphaerocephala exaristate, is epappose, but otherwise as in G. parviflora and has linear or very narrow leaves." (Jones, l. c.).

Just what Jones intended by this paragraph, which is copied exactly as it appeared, will never be known. Possibly some lines dropped out in his typesetting. Dr. Munz has sent eight sheets of material examined by Jones. Three of these were marked "sphaerocephala Jones" on the sheet, not on the label, in Jones' own hand; no other sheet is labeled by Jones himself. These three, from New Mexico (*E. L. Greene*, Pinos Altos Mountains, August 14, 1880; *Wooton* 501, White Mountains, Lincoln County; *Wooton*, Organ Mountains, October 18, 1903) are all GALINSOGA SEMICALVA (A. Gray) St. John & White (1920). Two other sheets so labeled by Munz come from the Sierra Madre, Chihuahua, both collected by Jones, one from Mound Valley, September 18, 1903, altitude 7,000 feet, the other from San Diego Canyon, September 16, 1903, altitude 6,400 feet. Both are *G. semicalva*, and the sheet from San Diego Canyon (Pomona Coll. Herb. No. 31053), is designated as lectotype.

There are also three sheets labeled by Munz with a specific name under *Galinsoga* that was not actually published by Jones, although he no doubt had it in manuscript. All are *Sabazia microcephala* DC. var. *puberula* DC. Two sheets, marked type collection by Munz, were collected by Jones in San Diego Canyon, Sierra Madre Mountains, Chihuahua, September 16, 1903, at 6,400 feet altitude. The third, a single dwarf plant, is labeled as collected in Soldier Canyon on the same date at 6,500 feet. In all these the stem is essentially glabrous below the inflorescence, the pedicels are pilose with spreading gland-tipped hairs, and the achenes are all epappose. In the two sheets of larger specimens the ray achenes

are sparsely hispidulous and the disk achenes more densely so; in the single small specimen those of the ray are glabrous, of the disk sparsely hispidulous.

Jones' brief description is evidently a jumble derived from the two species mentioned. The words "exaristate" and "epappose" can refer only to the *Sabazia*, which is completely epappose, whereas the pappus of the *Galinsoga*, on the disk achenes at least, is too obvious to have been overlooked. The character "linear or very narrow leaves," on the other hand, refers only to *Galinsoga semicalva*.

The only specific name actually printed by Jones is [*Galinsoga*] *sphaerocephala*. This must be referred to the synonymy of *G. semicalva* and can hardly be regarded as more than a hyponym.

Guardiola diehlii Jones, Contr. **12**: 48. 1908.

"Albuquerque and Sorocco [*sic*], New Mexico, August, 1903, Diehl." The description calls for a plant a foot high with leaves 2 inches long. Two sheets were sent. One (Pomona Coll. Herb. No. 40420), collected by I. E. Diehl (No. 593) at Socorro, August 26, 1903, agrees with the description and is taken as lectotype. The other, collected by Diehl (No. 106) at Albuquerque, October 1, 1903, although no doubt the basis of Jones' Albuquerque citation, is a dwarf plant only about 9 cm. high, with the largest leaves 2 cm. long. Both are FLAVERIA CAMPESTRIS J. R. Johnston.

Lagophylla scabrella [Drew] Jones, Extracts from Contr. **18**: 79. 1933.

Based on "*Hemizonia truncata* var. *scabrella* Jepson," a name which did not exist until Jones made it here. The synonym obviously intended was *Calycadenia truncata* var. *scabrella* (Drew) Jepson (Man. Fl. Pl. Calif. 1093. 1925), which was based on *Hemizonia scabrella* Drew (Bull. Torrey Club **16**: 151. 1889). Drew's plant has been variously treated as a species, subspecies, or variety under *Calycadenia* and *Hemizonia* by different authors. The one thing clear is that the plant, at least Drew's original, is not a *Lagophylla*.

Melampodium anomalum Jones, Extracts from Contr. **18**: 72. 1933.

Jones 27727, La Barranca, Guadalajara, Jalisco, November 17, 1930. This is TRAGOCEROS SCHIEDEANUM Less. Two sheets of the type number are in the Pomona College Herbarium; I designate No. 193188 as lectotype.

Melampodium durandi (A. Gray) Jones, Contr. **15**: 156. 1929, and **M. minimum** (A. Gray) Jones, *loc. cit.*

Jones' transfer of these two species was prefaced by the remark: "It is evident to me that Hemizonella of Gray is a part of the genus Melampolium [Melampodium]." He added: "Both the above species are closely allied to Melampodium hispidum H.B.K." Jones' generic concept here overleaps the subtribal boundaries that have been placed between *Melampodium* and *Hemizonella* by more serious students of the family, who will be content to retain the two species, if they are really distinct, as HEMIZONELLA DURANDI A. Gray and H. MINIMA A. Gray. If they are united, the proper name is *H. durandi* A. Gray.

Melampodium minutiflorum Jones, Extracts from Contr. **18**: 72. 1933.

Jones 27738, La Barranca, Guadalajara, Jalisco, November 17, 1930. This is GALEANA PRATENSIS (H.B.K.) Rydb., a member of the tribe Heleniеae. Rydberg recognized three species of *Galeana*, but his third species, *G. arenarioides* (Hook. & Arn.) Rydb., can certainly be reduced to *G. pratensis*, and *G. hastata* seems only dubiously distinct from it. Rydberg separated *G. arenarioides* from the two other species by its 4-toothed, mostly sterile disk flowers (5-toothed and partly fertile in the others), its shorter leaves (mostly less than 1 cm. long, instead of 1.5 to 3 cm.), and its lower growth (0.5 to 1.5 dm. high, instead of 2 to 3 dm.). Although Rydberg, *more suo*, did not write the name *G. arenarioides* on any sheets among the material he borrowed from the U. S. National Herbarium in connection

with the preparation of his treatment for the North American Flora, he did write it on the species cover in which he returned sheets of *Palmer* 1824 (of 1892) from Tepic and *Pringle* 2330 from Jalisco. It is a fair inference, therefore, that he regarded these specimens as representing his *G. arenarioides*, particularly since he cites the species only from these same two states. In both the disk corollas are 5-toothed, not 4-toothed as originally described by Hooker & Arnott and repeated by Rydberg, and in other respects they offer no distinctions of the slightest consequence to separate them from material that he has labeled *G. pratensis*. The specimens of *Jones* 27738 represent a profusely branched late-season form, with the primary leaves fallen and the small, entire, elliptic or narrowly obovate leaves of the branches much in evidence, giving the plant quite a different aspect from the rather trim and sparsely branched, *Galinsoga*-like plants of the early season.

Polymnia nervata Jones, Contr. **12**: 44. 1908.

Jones, "Guayanopa Canon, Sierra Madre Mts., Chihuahua, Sept., 1903, 3600 feet alt., in the Tropical Life Zone." This is MONTANOA PATENS A. Gray, the type of which also came from Chihuahua.

Sanvitalia longepedunculata Jones, Extracts from Contr. **18**: 78. 1933.

Jones "27761 and 27729, La Barranca, Guadalajara, Jalisco, November 19, 1930." Only No. 27761 has been examined, the sheet of which (Pomona Coll. Herb. No. 193601) is hereby designated as lectotype. It is SPILANTHES OCYMIFOLIA (Lam.) A. H. Moore.

Sclerocarpus triunfonis Jones, Extracts from Contr. **18**: 77. 1933.

Jones 27717, Triunfo, Baja California, October 6, 1930. This is SCLEROCARPUS DIVARICATUS (Benth.) Benth. & Hook. f. The species has not previously been recorded from Baja California, but its occurrence there is not surprising in view of its weedy nature.

Spilanthes palustris Jones, Contr. **12**: 45. 1908.

Jones, "Marsh Lake, Sierra Madre Mts., Chihuahua, Mex., Sept., 1903, 7,000 feet alt., in the Middle Temperate Life Zone." This is JAEGERIA GLABRA (S. Wats.) Robinson, originally described from the base of the Sierra Madre, Chihuahua.

Verbesina ampla Jones, Extracts from Contr. **18**: 75. 1933.

Jones 27780, La Barranca, Guadalajara, Jalisco, November 17, 1930. "Also No. 27699." I have seen only No. 27780, hereby designated as lectotype (Pomona Coll. Herb. No. 192828), which is the common and well-known VERBESINA GREENMANII Urban.

Verbesina cayucensis Jones, Extracts from Contr. **18**: 76. 1933.

Jones 27718, Cayuca Ranch, Loreto, Baja California, October 23, 1930. An isotype in the U. S. National Herbarium shows that this is VERBESINA PENINSULARIS Blake (1924). Munz writes that the species does not seem to be represented at Pomona.

Verbesina grandis Jones, Contr. **15**: 154. 1929.

Jones "No. 23420, Tepic, February 14, 1927, and No. 23421, Acaponeta, Nayarit, February 26, 1927." I have seen only No. 23420, hereby designated as lectotype (Pomona Coll. Herb. No. 200027), which is VERBESINA GREENMANII Urban (1907). Jones' name is preoccupied by *Verbesina grandis* Blake (1924).

Verbesina monticola Jones, Contr. **12**: 47. 1908.

I. E. Diehl, "Mound Valley, Sierra Madre Mts., Chihuahua, Mex., in meadows, at 7,000 feet alt., Sept., 1903, in the Middle Temperate Life Zone." The type (Pomona Coll. Herb. No. 39615) is VIGUIERA CORDIFOLIA A. Gray var. GENUINA Blake and is a form with lance-ovate leaves about 10 cm. long by 2.8 cm. wide. Jones' name is a homonym of *Verbesina monticola* Hook. f. (1864).

Verbesina pustulata Jones, Extracts from Contr. **18: 77. 1933.**

Jones 27711, The Laguna, Laguna Mountains, Baja California, September 22, 1930. This is apparently a good species of the section *Sonoricola*, close to *V. erosa* T. S. Brandeg and distinguished chiefly by its closely and rather evenly serrate leaves (teeth 4 or 5 per cm.), which are densely griseous-hirsute-pilose beneath and truncate-rounded at the base, where abruptly contracted into the short winged petiole. The three sheets of *V. erosa* examined show considerable variation in shape, toothing, and pubescence of the leaves, however, and it is possible that with more material the two will be found to intergrade. The immature achenes of *V. pustulata* are obovate, 4.5 mm. long, with narrow ciliate wings and glabrous or appressed-pilose sides; one pappus awn is 2.8 to 3.5 mm. long, the other scarcely half as long.

Viguiera longiligula Jones, Extracts from Contr. **18: 75. 1933 (as *Viguieria*).**

Jones "27708, La Barranca, [Guadalajara, Jalisco,] Nov. 15, 1930." What is apparently the type sheet has no collecting number, bears the typewritten name *Viguiera longiligula* n. sp., and is dated November 16, 1930 (printed label). It is VIGUIERA DENTATA (Cav.) Spreng. var. CANESCENS (DC.) Blake, with which Jones' description agrees well enough.

Viguiera magnicapitata Jones, Extracts from Contr. **18: 76. 1933 (as *Viguieria*).**

Jones 27701, La Barranca, Guadalajara, Jalisco, November 23, 1930 (November 25 on label). This is VIGUIERA PACHYCEPHALA (DC.) Hemsl. var. GENUINA Blake.

Viguiera triangularis Jones, Extracts from Contr. **18: 75. 1933 (as *Viguieria*).**

Jones 27710, Arroyo Undo Ranch, Loreto, Baja California, October 26, 1930. This is VIGUIERA DELTOIDEA A. Gray, in a nontypical form approaching var. *parishii* (Greene) Vasey & Rose.

Zexmenia epapposa Jones, Contr. **15: 155. 1929.**

Jones 23394, Acaponeta, Nayarit, near the El Tigre Mine, March 1, 1927. This is WEDELIA ACAPULCENSIS H.B.K. The name is poorly chosen, as the plant has the normal squamellate pappus of *Wedelia*.

Zexmenia pustulata Jones, Extracts from Contr. **18: 80. 1933.**

Jones, "northwestern Mexico, 1930." The sheet in the Pomona College Herbarium (No. 192946), marked by Munz as *Zexmenia pustulata* Jones, n. sp., bears the collecting number 27703 and is from La Barranca, Guadalajara, Jalisco, November 19, 1930. Jones' description agrees so well that there seems no reason to doubt that this sheet is actually the type. It is VERBESINA SPHAEROCEPHALA A. Gray, the type of which also came from Guadalajara.

Zinnia barrancae Jones, Extracts from Contr. **18: 78. 1933.**

Jones 27698, La Barranca, Guadalajara, Jalisco, November 17, 1930. This is ZEXMENIA GREGGII A. Gray, the type of which also came from Jalisco.

HELENIEAE

Bahia depressa Jones, Contr. **17: 31. 1930.**

Jones, "on cliffs near the Devil's River, [Val Verde County,] Texas, April 22, 1930." This is the only one of Jones' new Asteraceae, except the *Palafoxia* and a few Eupatorieae and Coreopsidinae examined by Robinson and Sherff, respectively, of which I have not seen the type or any authentic material. From description it is certainly the very distinctive DYSSODIA MICROPOIDES (DC.) Loes., with the outer pappus overlooked.

Chaenactis carphoclinia A. Gray var. **attenuata** (A. Gray) Jones, Contr. **12**: 48. 1908.

Jones' reduction of *Chaenactis attenuata* A. Gray to varietal rank is justified by the inconstancy of the distinctive characters.

Dyssodia fimbriata Jones, Extracts from Contr. **18**: 81. 1933 (as *Dysodia*).

Jones 27784, La Barranca, Guadalajara, Jalisco, November 16, 1930. The specimen sent agrees with Jones' description and with his data, except that the date is given as November 23. It is DYSSODIA CANCELLATA (Cass.) A. Gray.

Hutchinsonia hyalina Jones, Extracts from Contr. **18**: 85. 1933.

"Named for Mrs. Susan W. Hutchinson who was with me in Aaizona [Arizona] in 1931 and who collected this at Peach Springs in 1932." The type (Pomona Coll. Herb. No. 199211), was collected by Mrs. Hutchinson (No. 4595) west of Peach Springs, 4,000 feet altitude, on September 4, 1932. This plant, described as a new genus and species, is HYMENOTHRIX LOOMISII Blake (1927). This identification was communicated to Mrs. Hutchinson, who had sent a fragment of her material at my request, and the genus was retracted by Jones (*l. c.* 125,128) in two characteristic comments of which the last may be quoted: "Hutchinsonia hyalina Jones (See above) is a rayless form of Hymenothrix Wislizeni Gray which Blake has mistakenly named H. Morrissii [*sic*], it is not often that one can correct two blunders at once but his species cannot be maintained in the face of intergrades. I am indirectly obliged to him for the correction." Jones' generic name is a homonym of *Hutchinsonia* Robyns (Bull. Jard. Bot. Brux. **11**: 24. 1928).

Hymenothrix wislizeni var. **setiformis** Jones, Contr. **12**: 47. 1908.

"Oracle, Arizona, Aug. 28th, 1903. Tucson, Santa Rita Mts., Nutt, New Mexico, and an intermediate form at Colonia Juarez, Chihuahua, Mex." Two sheets seen: One from Oracle, Ariz., collected by Jones on the date given (here designated as lectotype: Pomona Coll. Herb. No. 30902); the other from Nutt, N. Mex., September 2, 1903, *I. E. Diehl.* Both are normal HYMENOTHRIX WISLIZENI A. Gray.

Laphamia scopulorum Jones, Contr. **12**: 48. 1908.

Jones, "Colonia Juarez, Chihuahua, Mex., Sept., 1903, at 6,000 feet alt., in the upper edge of the Lower Temperate Life Zone." Jones' name was doubtfully referred to the synonymy of *Perityle coronopifolia* A. Gray by Rydberg in the North American Flora (**34**: 19. 1914), evidently on the basis of description only, and my doubtful record of this species from Chihuahua in Kearney & Peeble's "Flowering Plants and Ferns of Arizona" (p. 972) was based on Rydberg's reference. Although superficially very similar to the dwarfer forms of that species with the most finely divided leaves, *L. scopulorum* is in fact a genuine *Laphamia* as I distinguish the genera, having the achenes linear-oblong, 2 mm. long, with very narrow callous margin, densely pilosulous all over on the sides as well as the margin (hence not definitely ciliate), with a pappus of two unequal awns up to 2 mm. long and a short crown of lacerate squamellae. It is a distinct species apparently nearest *Laphamia dissecta* Torr. but is readily distinguished by its white-rayed (not discoid) heads and its usually much smaller disk corollas (3 mm. long), with the proper tube nearly or quite as long as the cylindric throat and the teeth densely pilose on back (not merely glandular or sparsely pilose), as well as by its more finely divided leaves.

Palafoxia linearis var. **gigantea** Jones, Extracts from Contr. **18**: 79. 1933.

Jones, sand dunes west of Yuma, Ariz., September 26, 1931. This is a valid variety. The type has not been examined, but other material has been seen from the same region, including the type of the synonymous var. *arenicola* A. Nels. (Amer. Journ. Bot. **23**: 265. 1936).

Pectis multiflora Jones, Contr. **12**: 45. 1908.

Jones, "Soldier Canyon, Sierra Madre Mts., Chihuahua, Sept., 1903, in the Tropical Life Zone." Two sheets of the type collection sent, of which sheet No. 31382 (Pomona Coll. Herb.) is taken as lectotype. The specimens are PECTIS BARBERI Greenm., the type of which came from the Sierra Madre near Colonia García, Chihuahua, but for the most part they are so much more vigorous than the type specimens of this name that they might be taken for a different species if it were not for the intermediate forms also present in the same collection. The smaller specimens of Jones' plant are essentially scapose, up to 15 cm. high, with about 12 phyllaries, and agree well enough with Greenman's type collection. Larger plants are sprawling, several-stemmed, the stems once or twice dichotomous, the stem leaves oblanceolate, up to 3.5 cm. long and 5.5 mm. wide, and separated by internodes 2.5 to 4.5 cm. long, the involucres made up of as many as 20 phyllaries. Other less-developed heads on the same plant, however, have the normal number of phyllaries.

Pectis papposa ("*papoosa*") **var. sessilis** Jones, Contr. **12**: 46. 1908.

"Socorro, New Mexico, and near Hillsbora [Hillsboro], I. E. Diehl, Aug., 1903, in the Tropical Life Zone." Two sheets sent, one collected by Diehl (No. 612) at Socorro, August 26, 1903 (lectotype, Pomona Coll. Herb. No. 30654), the other collected between Hillsboro and Lake Valley, September 2, 1903. Neither is labeled by Jones, but there can be no doubt that they are type material. Both are PECTIS AUGUSTIFOLIA Torr., to which Jones' variety has already been reduced by Rydberg (N. Amer. Fl. **34**: 210. 1916). In both the pappus is not absent as described, but is reduced to a short subentire crown.

Porophyllum nodosum Jones, Extracts from Contr. **18**: 82. 1933.

Jones 22684, La Paz, Baja California, November 15, 1926. This is POROPHYLLUM GRACILE Benth.

Porophyllum purpureum Jones, Extracts from Contr. **18**: 81. 1933.

Jones 27777, La Barranca, Guadalajara, Jalisco, November 21, 1930. The type (Pomona Coll. Herb. No. 192964) is POROPHYLLUM VIRIDIFLORUM (H.B.K.) DC. A second sheet bearing the same name and number but the printed label "Orendain, Jalisco, Nov. 27, 1930," is so closely similar in every way that it is probably a plant of the type collection with a misplaced label. Nearly all the heads have fallen from both specimens, leaving the thickened peduncle tips with characteristically pitted receptacles. The few corollas remaining are so old and moldy that their original color can only be guessed at. By implication, Jones guessed that it was purple, since he contrasts it in this respect with his *P. rotundifolium* with greenish flowers; he does not mention the flower color, however, and his specific name may have had reference to the purplish-brown stems.

Porophyllum rotundifolium Jones, Extracts from Contr. **18**: 81. 1933.

Jones 27777a, Orendain, Jalisco, November 27, 1930. This also is POROPHYLLUM VIRIDIFLORUM (H.B.K.) DC., looking somewhat different from the last because it is in good flower rather than in old fruit. The heads in both are erect, as they usually are in this species, although Rydberg keys out *P. viridiflorum* and *P. nutans* from related species by their "distinctly nodding" heads.

Porophyllum simplex Jones, Contr. **12**: 46. 1908.

Jones, "Guayanopa Canon, Sierra Madre Mts., Chihuahua, Mex., [3,600 feet altitude,] Sept., 1903, in the Tropical Life Zone." This is retained as a species by Rydberg and separated in his key (N. Amer. Fl. **34**: 183. 1916) from the related *P. coloratum* (H.B.K.) DC., *P. linaria* (Cav.) DC., *P. seemannii* Sch. Bip., and *P. guatemalense* Rydb. by having its phyllaries "conspicuously purple-dotted,

acuminate," those of the other species mentioned being "merely purple-tinged, acute." The alleged difference in acuteness of the phyllaries is nonexistent, and the presence or absence of purple dots is certainly not of systematic significance. The young phyllaries in Jones' type are densely purple-speckled, but in the older heads, in which the phyllaries have assumed a more uniform purple color toward the margin, the spotting becomes weak or invisible. *Rose, Standley, & Russell* 12795, which Rydberg has labeled *P. coloratum*, is spotted like Jones' type of *P. simplex*. *Pringle* 11565, which has in general the deep purple and strongly glaucous involucre of *P. coloratum*, shows dense purple speckling under the purple suffusion. *P. simplex* was described by Jones as annual, but the specimen sent as type has no root. The plant is pretty clearly distinct from *P. coloratum* (H.B.K.) DC., which is an annual with extremely narrow leaves, but I cannot separate it specifically from *Palmer* 215 (of 1885), from Chihuahua, which has been referred to *P. seemannii* Sch. Bip., a species of which I have not seen the type. I therefore place *P. simplex* as a probable synonym of *P. seemannii*. Although described by Rydberg as linear or narrowly linear-oblanceolate, the leaves on Jones' type of *P. simplex* are chiefly elliptic or elliptic-oblanceolate, with a blade 3 to 4 cm. long, 5 to 8 (12) mm. wide, on slender petioles 5 to 8 mm. long.

SENECIONEAE

Cacalia coriacea Jones, Extracts from Contr. **18**: 80. 1933.

Jones, Orendain, Jalisco, November 28, 1930 (November 27 on label). The sheet (Pomona Coll. Herb. No. 192759) agrees well with Jones' description and is CACALIA PLATYLEPIS Rob. & Seaton, the type of which came from Río Blanco, Jalisco.

Cacalia tepicana Jones, Contr. **15**: 156. 1929.

Jones 23357, Tepic, Nayarit, February 10, 1927. This is SENECIO HARTWEGI Benth. The stem and even the youngest leaves on the specimen, which is in rather old fruit, are only thinly tomentose, but the plant is clearly identical with *Palmer* 1847 (of 1892) from Tepic and like it is referable to *S. hartwegi* rather than to *S. seemannii* Sch. Bip., if the latter is really specifically distinct.

MUTISIEAE

Perezia foliosa Jones, Contr. **15**: 154. 1929.

Jones "23358, La Barranca, Nayarit, February 21, 1927." The sheet sent (Pomona Coll. Herb. No. 162388), labeled as type by Munz, agrees well with Jones' description and data but is numbered 23359; Jones' citation of the number as 23358 is doubtless a typographical error. It is PEREZIA LONGIFOLIA Blake (1928) and is referred to that species by Bacigalupi in his monograph. Jones' name is a homonym of *P. foliosa* Rusby (1896). Jones described the leaves as linear-lanceolate to oblong-lanceolate, 1 to 1.5 cm. long, 2 to 3 cm. wide. The "1–1.5 cm." is doubtless an error for 1 to 1.5 dm.; the leaves of the type actually measure 13.5 to 21.5 cm. long.

Perezia kuhnioides Jones, Extracts from Contr. **18**: 73. 1933.

Jones 27693, La Barranca, Guadalajara, Jalisco, November 25, 1930 (type, Pomona Coll. Herb. No. 192834). A second sheet (No. 192831), bearing the same number in Jones' hand on the label and from the same locality but dated November 21, is a plant of the same species showing the lower part of the stem and well-developed leaves, which are lacking on the other sheet. Both are PEREZIA RIGIDA (DC.) A. Gray var. LINEARIFOLIA Bacigalupi. This varietal name is unfortunately chosen, inasmuch as the principal leaves are by no means linear. The involucre in Jones' plant is 7 to 7.5 mm. high, not 4 mm. as he gives it.

Perezia nervata Jones, Extracts from Contr. **18**: 74. 1933.

Jones, "Orendain, Jalisco, Nov. 26, 1930." The sheet (No. 192577) labeled as type of this species by Munz agrees well enough with Jones' description and is undoubtedly the type; it is dated November 28. Another sheet of the same species in better condition (*Jones* 27696, Orendain, November 27, 1930) is labeled through some error as *Perezia kuhnioides* Jones, n. sp., but agrees so well with the other sheet that it may well be merely a better-prepared specimen of the same collection. Both are VERNONIA SERRATULOIDES H. B. K. Jones had precedent in his error, for the same species was described as a *Perezia* (*P. paniculata*) by Gray in 1886.

Perezia nitens Jones, Extracts from Contr. **18**: 73. 1933.

Jones 27798, Guadalajara, Jalisco, November 26, 1930. This is GOCHNATIA GLOMERIFLORA A. Gray. It was once described by Sereno Watson as a *Perezia* (*P. capitata*). Jones' description applies without question to this sheet, but his account of the heads must have been based on a cluster rather than a single one, for they are 5- to 7-flowered and narrow, not "about 20-flowered, rather wide."

Perezia wrightii var. **arizonica** (A. Gray) Jones, Extracts from Contr. **18**: 73. 1933.

Gray himself reduced his *P. arizonica* to *P. wrightii* outright in 1883, and no later author has attempted to separate them, nor does Jones bring forward any alleged distinctive characters.

CICHORIEAE

Stephanomeria mexiae Jones, Extracts from Contr. **18**: 83. 1933.

Mexia 2506a, north of Baruschil, about 10 miles northwest of north of Minaco, Chihuahua, in dry side of wash, May 7, 1929 (type, Univ. Calif. Herb. No. 442618). The type, kindly lent by Dr. H. L. Mason, is STEPHANOMERIA THURBERI A. Gray. Mrs. N. Floy Bracelin, of the Botany Department of the University of California, writes me that the single sheet on which this species was based was included in *Mexia* 2506 as collected. The material of No. 2506 in the U. S. National Herbarium is *Pinaropappus junceus* A. Gray, which bears considerable habital similarity to *Stephanomeria thurberi*.

Stephanomeria minima Jones, Contr. **17**: 31. 1930.

Jones, "on the clayey plains at Fredonia, Arizona, June 1, 1929" (June 18 on label). The type is LYGODESMIA EXIGUA A. Gray, to which I have reduced the species in Kearney and Peebles, "Flowering Plants and Ferns of Arizona" (p. 1030. 1942).

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UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

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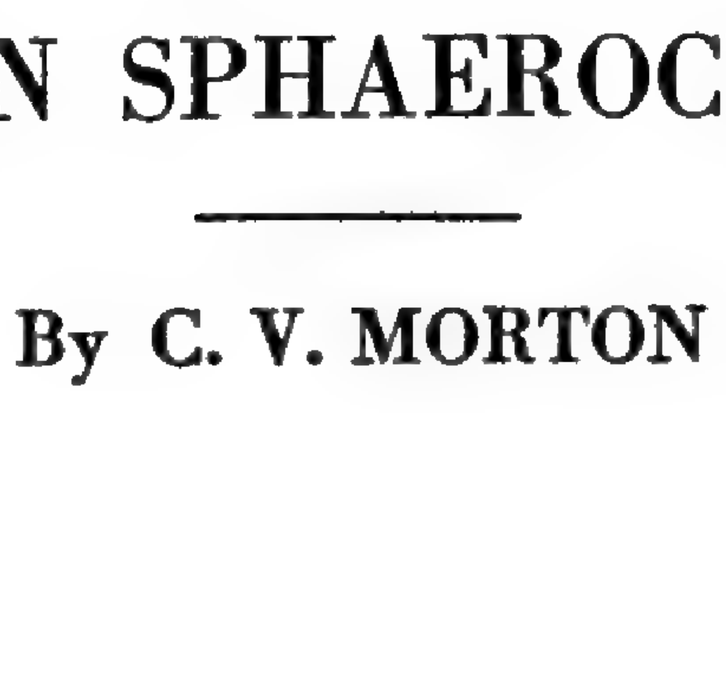
VOLUME 29, PART 3

THE AMERICAN SPECIES OF HYMENOPHYLLUM

SECTION SPHAEROCIONIUM

By C. V. MORTON



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PREFACE

THE present paper, by C. V. Morton, associate curator of the National Herbarium, is a critical account of the tropical American species of the section *Sphaerocionium* of the fern genus *Hymenophyllum*. Mr. Morton has worked on the genus at intervals for 15 years, and in the course of his study more than 1,000 specimens have been examined. Fifty-two species are here recognized, of which 10 are new. Several new varieties and forms are described also. Unfortunately, owing to present conditions abroad, a number of types preserved in foreign herbaria have not been available, and consequently several species remain dubious and several others are placed in synonymy with a query. However, it is not anticipated that the eventual study of these types will materially affect the nomenclature here adopted.

E. P. KILLIP,

Curator, United States National Herbarium.

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THE AMERICAN SPECIES OF HYMENOPHYLLUM, SECTION SPHAEROCIONIUM

By C. V. Morton

INTRODUCTION

My interest in the filmy ferns of the genus *Hymenophyllum* was first stimulated by an attempt in 1932 to identify a rather large series of Peruvian specimens collected by C. Bües, of Quillabamba, Peru. It was evident that the species centering around *H. sericeum* (Swartz) Swartz were in special need of revision. Hooker and Baker in their Synopsis Filicum had reduced to synonymy a number of species described by Sturm, Karsten, van den Bosch, and others, and although most of these had been given nominal recognition in Christensen's Index Filicum, they were still not well understood. Another group of species, including *H. elegens* Spreng., *H. trichophyllum* H. B. K., and *H. cruegeri* C. Müll., were confused by Hooker and Baker with *H. lineare* (Swartz) Swartz, the concept of which had been expanded by others to include also *H. pulchellum* Schlecht. & Cham. The original *H. lineare* was shown by Maxon to be a quite different species. Except for the publication in 1932 of *H. amabile*, my work on this group has remained in manuscript. Now, on taking it up again, I have expanded the treatment to include all the tropical American species of the section *Sphaerocionium*.

The Old World species of the section, which are much fewer (11 species only), have been carefully treated by Dr. E. B. Copeland.[1] The only species occurring in both the New and Old Worlds is the common *H. hirsutum*.

The present revision must be considered as tentative in some respects. It is regrettable that some of the type specimens have not been available for study, owing to the prevailing conditions abroad. For this reason several species have had to be listed as dubious, a few keyed and described on the basis of the original descriptions, and a few others placed in synonymy with a query. I do not anticipate, however, that when these species are definitely placed they will cause any considerable change in the nomenclature.

I am much indebted to the curators of the New York Botanical Garden and the Gray Herbarium of Harvard University for the loan of valuable specimens for study. All cited specimens lacking a "G" or "NY" are in the United States National Herbarium.

[1] Phil. Journ. Sci. **64**: 164–176. 1937.

HISTORY OF THE GENUS

Since the original segregation of the genus *Hymenophyllum* from *Trichomanes* by J. E. Smith in 1793, conservative botanists have universally recognized it as a natural genus. K. B. Presl in 1843 attempted a segregation and described the genera *Meringium*, *Leptocionium*, *Myrmecostylum*, *Ptychophyllum*, *Sphaerocionium*, and *Hymenoglossum*, all of which were reduced to synonymy shortly after by Hooker. Van den Bosch, in his synopsis of the genus in 1861, recognized *Leptocionium* and *Hymenoglossum* but reduced Presl's other genera. Most subsequent botanists, including Prantl, Sadebeck, Christensen, Hieronymus, Rosenstock, Maxon, and Christ, have regarded the genus in an inclusive sense. Recently, however, Dr. Copeland has recognized 12 genera. These are distinguishable, but are based on characters which I regard as of no more than sectional importance.[2] The history of these genera is so fully discussed by Dr. Copeland that it is unnecessary to go into it further at this time.

DIAGNOSTIC CHARACTERS

The group here treated as section *Sphaerocionium* is characterized by having at least the margins of the fronds hairy and by having the receptacle included within the indusium. It may seem unusual that a character of presence or absence of pubescence be considered as of sectional importance, but it appears to be true of ferns in general that the presence and character of pubescence are of greater fundamental importance than in flowering plants. In the present instance, there is scarcely any doubt that the hairy Hymenophyllums do form a coherent group, the species being more closely related to each other than to any of the glabrous species.

The type and distribution of the pubescence seem to be of primary importance in distinguishing the species. The section divides readily into two groups of 26 species each, here characterized as subsections, by the presence or absence of pubescence on the leaf surface between the veins. Although this character is usually obvious, in some cases a good deal of care must be taken by one unfamiliar with the species. For instance, *H. trichophyllum* and *H. pulchellum* (among others) are so densely pubescent that a high magnification is necessary to be sure that all the hairs arise on the veins and margins and none on the leaf surfaces. In addition, stalked stellate hairs of the veins and margins are easily broken off and may be lying on the leaf surfaces as if attached there. On the other hand, a few species, notably *H. sieberi*, have so few hairs on the leaf surfaces that they are apt to be placed in the subsection with glabrous surfaces unless a careful examination is made under a high magnification.

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[2] See my review, Amer. Fern Journ. **32**: 30–31. 1942.

Several types of hairs are found in the group: (1) Simple hairs, commonly 1-celled, but in some species with as many as four cells; (2) basally forked hairs, usually with two branches only, but occasionally with three, as in *H. tenerrimum*; sometimes the hairs appear to be merely paired without being actually joined at base, and it may be so in some cases; (3) forked hairs, that is, forked at some distance above the base; (4) stellate hairs, with a short or long stalk and three or more rays; the stalk and rays may be of more than one cell, particularly of the hairs borne along the stipe and rhachises; (5) twice-forked hairs, that is, forked at base and the branches (sometimes only one branch) again forked upwardly; (6) "bistellate" hairs, that is, forked at base, with the branches three to several-rayed at apex; and (7) "twice-stellate" hairs, that is, stalked hairs, the rays being forked or stellate at apex. Several types of hairs are usually found in the same species, often on different parts of the frond. These various types of hairs are diagrammatically illustrated in figure 1.

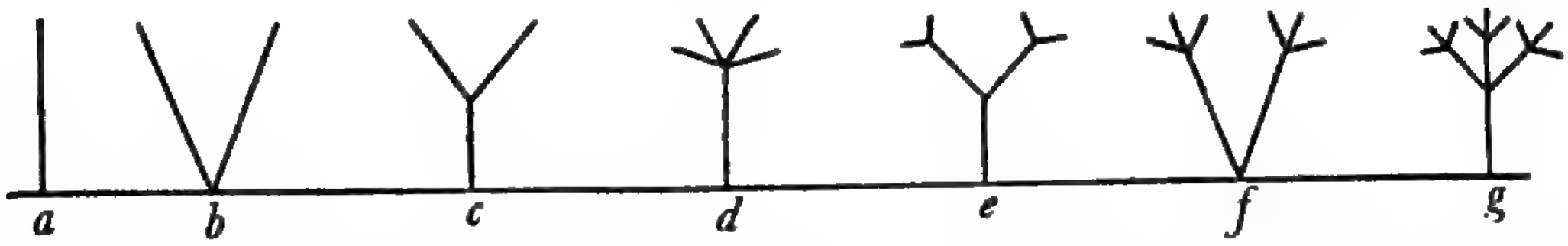

FIGURE 1.—*a*, Simple hair; *b*, basally forked hair; *c*, forked hair; *d*, stellate hair; *e*, twice-forked hair; *f*, bistellate hair; *g*, twice-stellate hair.

As is to be expected, the degree of dissection of the blade is also a character of major importance. Only a few species (e. g., *H. trichophyllum*), which have an entirely nonalate rhachis and petiolulate divisions, can be said to be truly pinnate, but for convenience the primary divisions of the frond are here termed "pinnae." Some species are truly pinnate at base and merely pinnatifid upwardly (e. g., *H. antillense*), but most are pinnatifid or pinnatisect throughout. The degree of development of the rhachis wing is a useful character in distinguishing species, as is also the presence or absence of a wing at the apex of the stipe.

The importance of the development of accessory wings not in the plane of the frond on the veins of the species allied to true *H. sericeum* was first pointed out by Karsten in his description of *H. fusugasugense* in his Flora Colombiana. In some species (e. g., *H. pyramidatum*) these wings are prominent and easily observed, but in one species (*H. plumosum*) they are very minute and a high magnification is necessary to see them, especially since they are overlaid with a dense covering of tomentum.

The indusia are similar in most species, being rounded, deeply 2-valved, and mostly a little immersed in the leaf tissue at base. The receptacles are similar in all the species, being short-columnar

and included within the indusia. No spore characters of value have been observed, although a detailed study of all the species might bring some to light.

There remains the difficult question of cell structure, which was so much emphasized by van den Bosch. Although differences in cell structure do exist in the Hymenophyllaceae in general, as witness the beautiful drawings in Copeland's revisions of the Old World species of *Trichomanes* and *Hymenophyllum*, in the section *Sphaerocionium* the cells seem to be relatively uniform. Some differences in thickness of cell walls and shape of cells have been found, but they are so vague as to be nearly indescribable and have therefore been omitted from the descriptions. A detailed study, accompanied by drawings, might bring out some points of interest as to the relationship of the species.

GEOGRAPHIC DISTRIBUTION

All the American species of *Hymenophyllum*, section *Sphaerocionium*, are exclusively tropical, with the exception of the Chilean *H. ferrugineum*. They are plants of wet forests and usually grow only in the higher mountains. Where they do grow they are abundant, often covering the tree trunks. Of the ten Cuban species four have been collected in Cuba only once and two others only two or three times. This is explained by the fact that all of them grow only or chiefly in the high Sierra Maestra of Oriente, which has been ascended by botanists only a few times and then mostly on the dry southern slopes where *Hymenophyllum* does not grow. The same condition prevails in Hispaniola, where our knowledge of the species depends chiefly on the fine collections of E. L. Ekman obtained from the higher mountains.

The Blue Mountains in eastern Jamaica are much more accessible, and consequently the species of *Hymenophyllum* have been abundantly collected, especially by Dr. William R. Maxon. They are well enough known to make it possible to assign rather definite altitudinal limits to the species, *H. hirsutum*, for instance, growing mostly at middle elevations, whereas *H. lineare*, *H. urbanii*, and *H. crispum* are known only from the higher elevations. The only Jamaican species of the section growing outside of the Blue Mountains is *H. hirtellum*, which is common throughout the eastern half of the island and does not reach elevations of more than 900 meters.

In Mexico seven species occur, all confined to the southern part of the country and for the most part very rare. They need to be much more extensively collected, for they mostly represent somewhat aberrant forms. On the other hand the genus is abundant in Guatemala, although chiefly confined to the Department of Alta Verapaz. The recent collections of P. C. Standley and J. A. Steyermark have extended the known ranges of several species. No species are known

from British Honduras or El Salvador, and only the wide-ranging *H. hirsutum* and *H. microcarpum* from Honduras and Nicaragua.

It is in the mountains of Costa Rica and the adjacent region of Volcán Chiriquí in Panama that the species of *Hymenophyllum* begin to reach their climax of development. Seventeen species are known from this region, six of them endemic. The best development of the genus occurs in the Andes from Colombia to Bolivia, where a good many interesting endemic species are found. Most of them grow at middle or high elevations, reaching as much as 4,000 meters in Peru, although one, here described as new, is found at only 200 meters in western Colombia. Brazil has several endemic species, some of them known to me from description only, as well as peculiar forms of several wide-ranging species. These widespread species (*H. hirsutum, H. crispum, H. microcarpum, H. elegans*, and *H. fragile*) are especially variable throughout their ranges, but it may be possible eventually to recognize some of the Brazilian forms as distinct.

The only notable examples of disjunct ranges are *H. pulchellum* (Mexico to Costa Rica, reappearing in southern Brazil), *H. antillense* (Jamaica and British Guiana), and *H. trapezoidale* (Mexico, Surinam, and Colombia).

The following is a tabulation of the species by countries:

CUBA: *elegans, elegantulum, fragile, hirsutum, hirtellum, lanatum, lineare, microcarpum, sericeum, urbanii.*

HISPANIOLA:[3] *elegans, elegantulum, fragile, hirsutum, hirtellum, lanatum, microcarpum, sericeum, urbanii.*

JAMAICA: *antillense, crispum, fragile, hirsutum, hirtellum, lanatum, lineare, microcarpum, sericeum, urbanii.*

PUERTO RICO: *elegantulum, hirsutum, lanatum, lineare, microcarpum, sieberi.*

MARTINIQUE: *hirsutum, latifrons, sericeum, sieberi, valvatum.*

GUADELOUPE: *elegans, hirsutum, lanatum, latifrons, lineare, sericeum, sieberi, valvatum.*

GRENADA: *elegans, hirsutum, lanatum.*

ST. KITTS: *hirsutum.*

DOMINICA: *hirsutum, latifrons.*

MONTSERRAT: *hirsutum.*

ST. LUCIA: *hirsutum.*

ST. VINCENT: *hirsutum, lanatum, latifrons.*

TOBAGO: *hirsutum.*

TRINIDAD: *dependens, elegans, hirsutum.*

MEXICO: *crispum, elegantulum, fragile, hirsutum, pulchellum, sieberi, trapezoidale.*

GUATEMALA: *crispum, elegans, elegantulum, fragile, hirsutum, lanatum, lineare, maxonii, microcarpum, pulchellum, sieberi.*

HONDURAS: *hirsutum.*

NICARAGUA: *hirsutum, microcarpum.*

COSTA RICA:[4] *consanguineum, crispum, dimorphum, elegans, elegantulum, fragile, hemipteron, hirsutum, horizontale, lineare, microcarpum, plumosum, pulchellum, semiglabrum, sieberi, subrigidum, trichophyllum.*

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[3] Also sp. dub. *H. diversilobum.*

[4] Also sp. dub. *H. palmense.*

PANAMA: *consanguineum, elegans, elegantulum, fragile, hemipteron, hirsutum* (probably), *microcarpum, plumosum, semiglabrum, subrigidum, trichophyllum.*
VENEZUELA: *crispum, dependens, elegans, fragile, hirsutum, interruptum, karstenianum, lanatum, lindenii, microcarpum, trichophyllum.*
COLOMBIA: *crispum, dependens, elegans, elegantulum, fragile, fusugasugense, hirsutum, interruptum, karstenianum, lindenii, lobato-alatum, microcarpum, multialatum, plumosum, ruizianum, silvaticum, trapezoidale, trichophyllum, valvatum.*
ECUADOR:[5] *amabile, crispum* (probably), *dependens, elegantulum, hirsutum, interruptum, karstenianum, lindenii* (?), *lobato-alatum, microcarpum, multialatum, plumieri, ruizianum, superbum, trichophyllum, valvatum.*
PERU:[6] *adiantoides, amabile, crispum, elegans, elegantulum, fragile, hirsutum, interruptum, karstenianum, lobato-alatum, microcarpum, molle, multialatum, plumosum, pyramidatum, ruizianum, simplex, speciosum, tenerrimum, trichophyllum, valvatum, verecundum.*
BOLIVIA: *crispum, elegans, elegantulum, fragile, hirsutum, interruptum, microcarpum, plumosum, pyramidatum, ruizianum, speciosum, tenerrimum, trichophyllum, valvatum, verecundum.*
BRITISH GUIANA: *antillense, crispum* (?), *hirsutum, microcarpum, roraimense, trichophyllum.*
FRENCH GUIANA: *hirsutum.*
SURINAM: *trapezoidale.*
BRAZIL: *angustum, crispum, elegans, fragile, glaziovii, hirsutum, microcarpum, plumosum, prionema, pulchellum, rufum, sampaioanum, silveirae, valvatum* (?).

SYSTEMATIC TREATMENT

KEY TO SPECIES

Hairs lacking on the leaf surfaces, borne only on the veins and margins.
Subsect. CILIATA
Hairs present on the leaf surfaces, as well as on the veins and margins.
Subsect. LANATA

SUBSECTION CILIATA

Fronds caespitose.
Stipes not alate; ultimate segments 1.5 mm. broad ..... 1. H. silveirae
Stipes alate; ultimate segments 0.5 mm. broad or less ... 2. H. dimorphum
Fronds scattered.
Stipes delicate, not over 0.3 mm. in diameter, usually less, short, not over 5 cm. long, usually less.
Rhachis not alate to base.
Pinnae (at least the lower) petiolulate.
Hairs marginal, simple or forked at base; fronds ovate or oblong, determinate ..... 3. H. lineare
Hairs borne on the veins as well as the margins, stellate; fronds linear, indeterminate.
Pinnae with 5–7 pairs of segments, the costa continuously winged on both sides.
Fronds skeletonlike, the segments distant; stipe hairs mostly simple, rarely forked ..... 4. H. molle
Fronds not skeletonlike, the segments adjacent or imbricate; stipe hairs mostly stellate ..... 5. H. pulchellum
Pinnae normally with only 1 to 3 pairs of segments, or some of them becoming elongate and frondlike.

[5] Also sp. dub. *H. refrondescens.*
[6] Also spp. dub. *H. crispatulum, H. tomentosum,* and *H. trifidum.*

Costa not continuously winged on both sides. 6. **H. trichophyllum**
Costa continuously winged on both sides.
Pinnae 9 pairs or more, pinnatifid, the segments mostly more than 1 pair; ultimate segments mostly less than 1 mm. broad. 7. **H. urbanii**
Pinnae 8 pairs or fewer, simple, bifid, or with 1 (rarely 2) pairs of segments; ultimate segments 1–1.8 mm. broad. 8. **H. roraimense**
Pinnae sessile or adnate.
Hairs absent on the veins, the marginal ones mostly 3-forked at base, some of the branches sometimes again forked___ 9. **H. tenerrimum**
Hairs present on the veins, the marginal ones not 3-forked at base.
Stipe hairs simple or forked; marginal hairs of the segments forked at base or mostly twice-forked, the branches and rays elongate; pinnae subflabellate or rarely simple or merely bifid, 4.5–8 mm. long, the segments mostly 1 or 2 pairs_____ 10. **H. elegans**
Stipe hairs mostly stellate; marginal hairs of the segments mostly stellate or bistellate, or forked or twice-forked, the branches and rays short; pinnae subrhombic, 9–11 mm. long, the segments 3 or 4 pairs_____ 11. **H. adiantoides**
Rhachis alate to base.
Marginal hairs of segments mostly stellate, bistellate, or twice-forked.
Pinnae simple or merely bifid at apex; stipe hairs simple. 10. **H. elegans f. minor**
Pinnae more dissected; stipe hairs mostly stellate_ 12. **H. hirsutum**
Marginal hairs of segments mostly simple or forked at base.
Stipe not alate at apex.
Pinnules bifid or trifid; indusial lobes incised-lacerate. 13. **H. prionema**
Pinnules mostly simple and entire; indusial lobes subentire.
Ultimate segments 1.2–2 mm. broad; hairs present on veins of lower side; indusial valves 1 mm. broad; stipes 10–40 mm. long. 14. **H. semiglabrum**
Ultimate segments 0.8–1 mm. broad; hairs lacking on veins; indusial valves 0.8 mm. broad; stipes 1.5–4 mm. long_ 15. **H. silvaticum**
Stipe alate at apex.
Segments not undulate-crispate; plants dwarf, not over 2.5 cm. long. 16. **H. sampaioanum**
Segments undulate-crispate; plants much larger___ 17. **H. crispum**
Stipes stouter, 0.3 mm. in diameter or mostly more, the larger almost always 5 cm. long or more.
Rhachis alate to base.
Hairs lacking on veins of upper surface; marginal hairs simple or forked at base.
Segments undulate; plants light green, delicate___ 18. **H. valvatum**
Segments not undulate; plants usually dark green, coarse.
Stipes alate at apex_____ 19. **H. microcarpum**
Stipes not alate at apex_____ 20. **H. consanguineum**
Hairs present on the veins of the upper surface; marginal hairs mostly stellate, bistellate, or twice-forked.
Blades linear-lanceolate, not more than 3 cm. broad_ 21. **H. glaziovii**
Blades ovate to ovate-lanceolate or lanceolate, 2.5–7 cm. broad.
Stipe nearly nonalate; pinnae acuminate, the pinnules mostly pinnatifid_____ 22. **H. hirtellum**

Stipe obviously alate; pinnae obtuse to acute, the pinnules mostly simple or bifid, except the basal---------- 23. **H. maxonii**

Rhachis not alate to base.

Hairs absent from veins of upper surface, those of the veins of the segments of the lower surface mostly simple or forked at base.

24. **H. subrigidum**

Hairs present on veins of both surfaces, those of the veins of the segments at least partly stellate.

Lower pinnae subpetiolulate, tripinnatifid or almost completely bipinnate at base; fronds 9–17 cm. broad; pinnules of primary pinnae 9–12 pairs; stipes 0.7–1.6 mm. in diameter------ 25. **H. ruizianum**

Lower pinnae slightly adnate, bipinnatifid, not at all bipinnate; fronds 2–6 cm. broad; pinnules of primary pinnae 4–7 pairs; stipes not more than 0.6 mm. in diameter---------- 26. **H. trapezoidale**

SUBSECTION LANATA

Veins not winged on either side of the frond.

Stipes filiform, 0.2–0.25 mm. in diameter.

Hairs of stipe simple, elongate, 2- or 3-celled, or some forked, the rays elongate, 1- or 2-celled.

Rhachis conspicuously alate throughout; stipe alate at apex; leaf segments 2.5–3 mm. broad; marginal hairs mostly twice-forked, the primary rays elongate, 0.5–0.7 mm. long---------- 27. **H. latifrons**

Rhachis not alate, except sometimes in depauperate plants; stipe not alate; leaf segments not over 1.5 mm. broad; marginal hairs stellate or bistellate, the stalks or primary rays less than 0.5 mm. long.

Ultimate segments mostly about 1 mm. broad; lowest pinnae petiolulate.

Segments of pinnae mostly 1 or 2 pairs; fronds elongate-linear; basal segments of pinnae 1-veined---------- 28. **H. antillense**

Segments of pinnae mostly 3 pairs or more; fronds mostly ovate, rarely lanceolate; basal segments of pinnae with simple or once-forked veins---------- 29. **H. hemipteron**

Ultimate segments mostly more than 1 mm. broad; lowest pinnae sessile or rarely petiolulate. Segments of pinnae mostly more than 3 pairs, the basal with dichotomous veins---------- 30. **H. elegantulum**

Hairs of stipe mostly stellate (sometimes a few merely forked), the stipe and rays mostly 1-celled.

Pinnae mostly simple and linear; hairs of leaf surfaces and margins obviously stalked.

Rhachis not alate at base---------- 31. **H. simplex**

Rhachis alate throughout; stipe alate at apex------ 32. **H. lanatum**

Pinnae mostly pinnatifid or, if sometimes simple or merely bifid, the hairs of the leaf surfaces and margins subsessile.

Rhachis alate throughout; stipe alate at apex; segments of pinnae not over 3 pairs; plants not densely lanate; hairs of rhachis and veins simply stellate, the rays 1-celled.

Blades 10–25 mm. broad, 2–7 times as long as broad; pinnae 4–20 pairs. 33. **H. fragile**

Blades narrower, not over 11 mm. broad, 5–20 times as long as broad; pinnae 15–40 pairs. Ultimate segments 0.7–1 mm. broad 34. **H. angustum**

Rhachis and stipe non-alate; segments of pinnae 4–8 pairs; plants densely lanate; some of the hairs of rhachis and veins twice stellate or with 2-celled rays---------- 35. **H. amabile**

Stipes stouter, 0.4–0.6 mm. in diameter.
Plants densely and closely tomentose; rhachis hardly at all alate.
Hairs of rhachis appressed, stellate, short-stalked; rhachis flexuous; pinnae elongate (4–8.5 cm. long); fronds elongate, up to 165 cm. long
36. H. speciosum
Hairs of rhachis not appressed, some of them long-stalked, some twice stellate; rhachis not flexuous; pinnae shorter, mostly 2–3.5 cm. long; fronds shorter, up to 50 cm. long---------- **37. H. karstenianum**
Plants pilose, sometimes densely so, but not tomentose; rhachis alate, except in some plants of *H. rufum*. Hairs of stipe mixed, i. e., simple, forked, and stellate.
Marginal hairs mostly 4–6-rayed, subsessile; rhachis normally nonalate to middle; lower pinnae sometimes slightly petiolulate-- **38. H. rufum**
Marginal hairs forked or stellate and mostly 3- or 4-rayed; rhachis normally alate throughout or nearly so (except in *H. interruptum*); pinnae all sessile or adnate.
Fronds of an ovate-oblong type, 6–14 cm. broad------ **39. H. lindenii**
Fronds linear, 8 cm. broad or less.
Rhachis nonalate at base; blades gradually reduced downward; marginal hairs often merely forked, some 3-rayed or bistellate; blades with alternating sterile and fertile portions.
40. H. interruptum
Rhachis alate throughout, often the stipe alate at apex also; blades rather abruptly reduced downward; marginal hairs often stellate or bistellate; fertile portions of blades continuous.
Stipe 7.5–16 cm. long, nonalate or nearly so; hairs of leaf surfaces, veins, and margins short-stalked, the marginal mostly bistellate.
41. H. superbum
Stipe 8 cm. long or usually less, alate at apex.
Hairs of leaf surfaces numerous, obviously stalked; marginal hairs mostly bistellate. Pinnae rather distant, not imbricate.
42. H. dependens
Hairs of leaf surfaces few, subsessile; marginal hairs mostly stellate, only a few bistellate, or some merely furcate at base.
Segments of pinnae shallowly lobed, the ultimate segments 1 mm. long or less, less than 1 mm. broad. Pinnae close, mostly subimbricate---------- **43. H. sieberi**
Segments of pinnae rather deeply lobed, the ultimate segments 1–3 mm. long, more than 1 mm. broad-- **44. H. plumieri**
Veins winged on one or both sides of the frond.[7]
Rhachis alate, except sometimes at base.
Rhachis only slightly alate by the decurrent bases of the pinnae. Veins winged on both sides of the frond, the wings minute; stipe hairs mixed, i. e., simple, forked, and stellate---------- **45. H. sericeum**
Rhachis conspicuously alate.
Veins not winged on the upper side of the frond, inconspicuously winged on the lower side, the wings interrupted, distant.
Hairs of stipe simple or mostly forked; pinnae rounded at apex; stipes 0.3–0.4 mm. in diameter; indusia deeply immersed at base.
46. H. horizontale
Hairs of stipe mostly stellate, a few simple or forked; pinnae acuminate; stipes 0.4–0.7 mm. in diameter; indusia often rather shallowly immersed---------- **47. H. lobato-alatum**

[7] I. e., with accessory wings not in the plane of the frond.

Veins winged on both sides of the fronds.

Stipes with mixed simple, forked and stellate hairs, alate to middle or more; pinnae linear-lanceolate, large (2.5–3.7 cm. long, 7–10 mm. broad at base), acuminate, with numerous segments.

48. **H. pyramidatum**

Stipes usually nearly glabrous (the hairs whitish, simple or forked), nonalate or slightly alate at apex only; pinnae ovate or ovate-oblong, smaller (up to 2.5 cm. long, not more than 8 mm. broad at base), obtuse or rarely acutish, usually with few segments.

49. **H. verecundum**

Rhachis nonalate throughout.

Wings of the veins narrow and very inconspicuous; blades finely appressed-tomentose, the hairs mostly subsessile; stipe hairs mostly stellate.

50. **H. plumosum**

Wings of the veins broad, conspicuous; blades stellate-pilose; stipe hairs mostly simple or forked.

Leaf surfaces with scattered hairs only---------- 51. **H. multialatum**

Leaf surfaces densely stellate-pilose---------- 52. **H. fusugasugense**

1. **Hymenophyllum silveirae** Christ, in Schwacke, Pl. Nov. Mineiras **2**: 14. 1900; Bull. Herb. Boiss. II. **2**: 320. 1902.

Plants terrestrial, densely caespitose, 2–2.5 cm. high; stipes filiform, 1 cm. long, not alate, flexuous; blades oblong, 1–1.5 cm. long, 1 cm. broad, attenuate to base, bipinnatisect, the rhachis alate; pinnae ovate, deeply incised, the lobes flabellately disposed, simple, linear, 1.5 mm. broad near apex, ciliate near apex, the hairs subsimple; sori few, rotund, the segments contracted below the sori, the valves densely long-red-ciliate.

TYPE: Serra do Campestre, Brazil, *Silveira* 2332.

RANGE: Confined to southern Brazil.

ADDITIONAL SPECIMENS:

BRAZIL: Serra das Camarinhas, *Schwacke* 11085. Itacolumi, alt. 1,750 meters, *Schwacke* 12528.

The above description is adapted from the original. I am somewhat doubtful about this and the following species, for the character of caespitose fronds is hardly to be expected in this section of *Hymenophyllum*. Christ's descriptions are sometimes inaccurate and may be so in these cases. Even with this character, ignored, however, the two species do not fit into any of the recognized species, and so I am recognizing both provisionally.

2. **Hymenophyllum dimorphum** Christ, Bull. Herb. Boiss. II. **4**: 941. 1904.

Rhizomes filiform; fronds caespitose, the stipes 2 cm. long, alate, the blades ovate-oblong, 3 cm. long, bipinnatifid; sterile fronds with the pinnae triangular, deeply flabellately lobed, broadly adnate to the alate rhachis, the segments falcate, linear, about 1 cm. long, 0.5 mm. broad, the lowest furcate at apex, ciliate, the hairs stellate; fertile fronds with pinnae and segments shorter and narrower, the segments nearly filiform, the upper ones all soriferous; plants firm in texture, blackish in drying; sori 1 mm. long, the valves ovate, spinulose with short, rigid hairs.

TYPE: Alto de Mano Tigre, Costa Rica, alt. 700 meters, *Pittier*.

RANGE: Known only from the type.

The present species is known to me by description only. It must be quite distinct.

3. Hymenophyllum lineare (Swartz) Swartz, Journ. Bot. Schrad. **1800**[2]: 100. 1801.

Trichomanes lineare Swartz, Prodr. Veg. Ind. Occ. 137. 1788.
Didymoglossum lineare Desv. Mém. Soc. Linn. Paris **6**: 331. 1827.
Sphaerocionium lineare Presl, Hymenoph. 34. 1843.
Hymenophyllum catherinae Hook. in Hook. & Baker, Syn. Fil. 67. 1867. Type from Catherine's Peak, Jamaica, *Wilson* 573 (fragment US).

Rhizomes creeping, filiform, about 0.2 mm. in diameter, sparingly hairy; fronds determinate; stipes 1–3 cm. long, filiform, 0.2–0.3 mm. in diameter, nonalate throughout, sparingly hairy, the hairs simple or forked, the stalk and branches 1-celled; blades ovate to narrowly oblong, 4–9 cm. long, 1.5–4 cm. broad, rounded or acutish at apex, the rhachis nonalate below, narrowly alate toward apex; pinnae 8–10 pairs, the lowest very short-petiolulate, the upper adnate, widely spreading, ovate, 7–18 mm. long, 3–9 mm. broad, deeply pinnatifid, the costa narrowly winged; segments 3–5 pairs, the lower two or three deeply bifid, the ultimate segments 0.5–0.8 mm. broad; hairs of the rhachis forked or mostly stellate, 3-rayed, long-stalked, lacking on the veins, those of the margins simple or forked at base; sori numerous, borne on most of the upper segments, the indusia much broader than the segments, the valves rotund, about 1 mm. long and broad, ciliate, the hairs all simple.

TYPE: Jamaica, *Swartz*.

RANGE: Cuba, Jamaica, Puerto Rico, Guadeloupe, Guatemala, and Costa Rica.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Loma del Gato, Sierra Maestra, alt. 1,000 meters, *Clément* 777.

JAMAICA: Blue Mountains, at elevations of 1,500 to 1,900 meters: J. P. 59; *Jenman; Hart* 5; *Webster & Goldberg* 149; *Orcutt* 5585; *Watt* 37; *Chrysler* 1809b; *Harris* 7105; *Clute* 274a; *Underwood* 517, 873; *Maxon* 1227, 9726.

PUERTO RICO: Catalina-Yunque Trail, *E. G. Britton* 7681. Alta de Bandera, *Chase* 6471b. Luquillo Mountains, *P. Wilson* 168.

GUADELOUPE: *Duss* 4387; *Questel* 1102; *Stehlé* 1778.

GUATEMALA: Department of Alta Verapaz, at elevations of 600 to 1,200 meters: *H. Johnson* 361, 814, 922; *Cook & Doyle* 148.

COSTA RICA: La Palma, alt. 1,600 meters, *Standley* 33139. San Gerónimo, *Wercklé* 547.

The name *H. lineare* (often misapplied by earlier botanists) was restored to its proper application by Dr. Maxon (Pterid. Porto Rico 506. 1926). The Duss specimen from Guadeloupe cited above has fronds up to 22 cm. long and has been given a manuscript varietal name by Christ, but it does not seem to differ other than in size.

4. Hymenophyllum molle Morton, sp. nov.

Rhizoma repens; frondes pendulae, indefinitae, stipitibus non alatis, parce pubescentibus, pilis simplicibus vel raro furcatis; laminae lineares, rhachibus flexuosis, non alatis; pinnae numerosae, adscendentes, infimae breviter petiolulatae, pinnatisectae, costa flexuosa, anguste alata, pinnulis inferioribus 2–4-dichotomis, superioribus simplicibus, segments ultimis angustissimis; pili in rhachibus numerosi, appressi, stellati, breviter stipitati, 4–6-radiati, radiis suberectis, vel bis-stellati, in venis et marginibus numerosi, stellati, subsessiles, radiis plerumque 5 vel 6, elongatis, patentibus; sori parvi, indusiis subimmersis, quam segmentis angustioribus, valvis perspicue ciliatis, pilis stellatis.

Rhizomes creeping, 0.2–0.3 mm. in diameter; fronds pendent, indeterminate; stipes black, 3–6 cm. long, 0.2 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs simple, several-celled, or rarely forked; blades linear, 10–30 cm. long, 2–3.5 cm. broad, the rhachis flexuose, nonalate throughout; pinnae ascending, 10–25 pairs, 1–3 cm. long, 5–10 mm. broad, the lower short-petiolulate,

the middle and upper sessile, not decurrent, deeply pinnatisect, the costa flexuous, narrowly alate throughout, the wing about 0.25 mm. broad on either side; pinnules 5 or 6 pairs, the lower 2 to 4 times dichotomously divided, the upper bifid, the uppermost simple, the ultimate segments narrowly linear, up to 5 mm. long, 0.6–0.8 mm. broad; hairs of the rhachis numerous, appressed, stellate, short-stalked, 4–6-rayed, the rays suberect, or sometimes twice-stellate, those of the veins and margins very numerous, all stellate, subsessile, the rays mostly 5 or 6, elongate, spreading, 0.4–0.6 mm. long; sori very small, narrower than the segments, slightly immersed at base, the valves broader than long, about 0.5 mm. long, entire, long-ciliate, the hairs all stellate.

Type in the U. S. National Herbarium, No. 1831546, collected at the Achirayoc Inca Ruins, District of Vilcabamba, La Convención, Department of Cuzco, Peru, at an elevation of 3,000 meters, July 1934, by C. Bües (No. 2102).

RANGE: Known only from the Department of Cuzco, Peru, at elevations of 2,200 to 3,150 meters.

ADDITIONAL SPECIMENS EXAMINED:

PERU: Achirayoc, *Bües* 2115. Abra Mirador, *Bües* 2072. Huadquiña, *Bües* 708. Huaguapata, *Bües* 1407.

The present peculiar species somewhat suggests *H. amabile* from the same region in its soft, dense pubescence, but it may be distinguished at once by its nonalate rhachis and more deeply dissected pinnae, in addition to the lack of hairs on the leaf surfaces. The closest relationship is doubtless with *H. trichophyllum*.

5. **Hymenophyllum pulchellum** Schlecht. & Cham. Linnaea **5**: 618. 1830.

Sphaerocionium pulchellum Presl, Hymenoph. 34. 1843.

Hymenophyllum chrysothrix Sturm, in Mart. Fl. Bras. **1**[3]: 298. 1859. Type from Serra da Estrella, Brazil, *Martius*. Placed here from description, and also from a notation on the label of *Burchell* 2259, "*H. pulchellum*=*H. chrysothrix*, fide Mettenius."

Hymenophyllum pannosum Christ, Bull. Herb. Boiss. II. **5**: 250. 1905. Type from Costa Rica, *Wercklé* (isotype US). A dwarf, very densely pubescent form.

Hymenophyllum lineare var. *brasiliense* Rosenst. Hedwigia **46**: 74. 1906. Type from Santa Cruz, Rio Grande do Sul, Brazil, *Juergens* 137 (Rosenst. exs. 157) (isotypes NY, US).

Hymenophyllum lineare var. *brasiliense* f. *tuberosum* Rosenst. loc. cit. Type from Rio Grande, São Paulo, Brazil, *Wacket* (Rosenst. exs. 175) (isotype US).

Hymenophyllum lineare var. *brasiliense* f. *pseudocarpum* Rosenst. loc. cit. Type from Rio Grande, São Paulo, Brazil, *Wacket* (Rosenst. exs. 176) (isotype US).

Rhizomes filiform, 0.15–0.3 mm. in diameter; fronds pendent, indeterminate; stipes filiform, 0.1–0.3 (rarely 0.5) mm. in diameter, terete, nonalate throughout, deciduously pubescent, the hairs stellate, short-stalked, mostly 4-rayed, the rays 1-celled; blades oblong to linear, extremely variable in size, 2–50 cm. long (normally 15–20 cm.), 1–4.5 cm. broad (normally 1.5–2.5 cm.), rounded at apex, the rhachis not at all alate or very rarely the uppermost pinnae slightly decurrent; pinnae ascending, 4 to many pairs (normally 15–25), all but the uppermost short-petiolulate, lanceolate, up to 2.5 cm. long and 1.4 cm. broad, pinnatifid, the costa continuously winged on both sides; segments (4) 5–7 pairs, the basal bifid or rarely quadrifid, the ultimate segments 0.7–1 (rarely 1.5) mm. broad; hairs of the rhachis stellate, mostly 6-rayed, partly sessile, the rays elongate, 1-celled, partly short-stalked, the rays very long and several-celled, those of the veins and margins numerous, all stellate, 3–6-rayed, sessile or short-stalked; sori borne on the apical segments of the pinnae only, the indusia scarcely immersed at base, not broader than the segments, the valves hemispheric, 0.7–1 mm. long, 0.9–1 (rarely 1.4) mm. broad, glabrous externally, long-ciliate, the hairs stellate.

TYPE: Jalacingo, Veracruz, Mexico, *Schiede.*

RANGE: Mexico, Guatemala, Costa Rica, and southern Brazil.

ADDITIONAL SPECIMENS EXAMINED:

MEXICO: Orizaba, Veracruz, *Pringle* 5591 (distributed as *H. lineare*). Chistla, *Liebmann* (distributed as *H. plumosum*). Mirador, Veracruz, *Purpus* 152.

GUATEMALA: Departments of Alta Verapaz, San Marcos, and Suchitepéquez, at elevations of 500 to 2,800 meters: *von Tuerckheim* 12, II. 1569, II. 1936; *Hatch & Wilson* 232, 372; *Cook & Griggs* 440; *Cook & Doyle* 57; *Donnell Smith* 1549; *Johnson* 368, 706, 928; *Steyermark* 35436, 36710, 37128.

COSTA RICA: Las Nubes to La Palma, *Knight* 29268, 29271. Pacayos, *Lankester* 648b.

BRAZIL: *Burchell* 3546 (G), 2259 (G, US); *Riedel* 34 (G), 47. Rio Grande, São Paulo, *Krieger* (NY). Serra do Mar, São Paulo, *Wacket* (Mus. Paulista 1296) (NY). Cajurú, São Paulo, *Luederwalt* (Mus. Paulista 1539) (NY). Hamburger Berg, Rio Grande do Sul, *Lindman* (Regnell A487). Caldas, Minas Gerais, *Regnell* III. 1485. Fortaleza, Paraná, *Dusén* 2935. Rio de Janeiro, *Brade* (NY). Ypiranga, Paraná, *Dusén* 6524 (NY, US). Lages, Santa Catherina, *Spannagel* 121 (NY).

6. Hymenophyllum trichophyllum H. B. K. Nov. Gen. & Sp. **1**: 27. 1815.

Hymenophyllum procerum v. d. Bosch, Ned. Kruid. Arch. **4**: 409. 1859 (*nom. nudum*). Based on *H. pulchellum* sensu Mett. Fil. Lechl. 1: 25. 1859, not Schlecht. & Cham., but Mettenius gives no description.

Hymenophyllum moritzianum Sturm in Mart. Fl. Bras. **1**[2]: 295. 1859. Type from Mérida, Venezuela, *Moritz* 344 p. p.

Hymenophyllum eriophorum v. d. Bosch, Ned. Kruid. Arch. **5**[3]: 180. 1863. Type from the "Andes of Quito," *Jameson* 82.

Hymenophyllum trichophyllum var. *contractum* Hieron. Hedwigia **45**: 226. 1906. Type from Mount Tolima, Colombia, *Stuebel* 43.

Sphaerocionium trichophyllum Copel. Phil. Journ. Sci. **67**: 32. 1938.

Rhizomes filiform; fronds pendent, indeterminate; stipes black, shining, filiform, about 0.25 mm. in diameter, nonalate throughout, slightly pilose, the hairs mostly simple, 2- or 3-celled, a few forked or stellate and 3-rayed; blades variable in outline, the rhachis elongate, black, filiform, nonalate; pinnae many pairs, normally 10–15 mm. long, pinnate-pinnatifid (or some of them elongate and frondlike, bipinnate-pinnatifid), short-petiolulate; pinnules normally 2 or 3 pairs, decurrent but not forming a continuous wing along the costa, the basal superior ones usually with twice-dichotomous veins, the ultimate segments linear, 0.5 to rarely 1 mm. broad; hairs of rhachis stellate, 6- or 7-rayed, subsessile, those of the veins and margins all stellate, 4–6-rayed, subsessile, the rays elongate; indusia slightly immersed at base, narrower than the segments, the valves densely ciliate, the hairs stellate, stalked.

TYPE: Between Cocollar and Guardia de San Augustin, Cumaná, Venezuela, *Humboldt.*

RANGE: Costa Rica, Panama, British Guiana, and Venezuela to Bolivia, at elevations of 1,800 meters and higher.

SPECIMENS EXAMINED:

COSTA RICA: Cerro Gallito, alt. 1,800 meters, *M. Valerio* 305. Cerro de Las Lajas, alt. 2,000–2,400 meters, *Standley & Valerio* 51525. Las Nubes, *Standley*, 38447, 38733.

PANAMA: Above El Boquete, Province of Chiriquí, alt. 1,650–1,800 meters, *Killip* 5273.

BRITISH GUIANA: Summit of Mount Roraima, *Tate* 453 (NY).

VENEZUELA: Cerro de Turumiquire, *Tate* 331. Colonia Tovar, *Fendler* 327 (G).

COLOMBIA: Departments of Norte de Santander, Cundinamarca, El Cauca, Tolima, Caldas, and Nariño, at elevations of 2,500 to 4,200 meters: *Stuebel* 237, 336; *Mutis* 3205; *Ariste Joseph* s. n., A518; *Killip & Smith* 20660; *Killip* 6705 (NY, US), 6720 (NY, US), 12140; *Killip & Hazen* 9478 (NY, US); *Pennell* 6989 (NY, US); *Pennell & Hazen* 9941 (NY, US), 10080 (NY, US); *Lehmann* 652, 6397; *Apollinaire Marie* 27.

ECUADOR: Provinces of Tunguragua and Carchi, at elevations of 3,200 to 4,000 meters: *Jameson* (G); *Couthouy* 67 (G); *Mille* s. n. (G, NY), 120; *Stuebel* 813; *Penland & Summers* 882.

BOLIVIA: Comarapa, alt. 2,600 meters, *Herzog* 1952. Yungas, *Pierre Jay*, June–July, 1893 (NY, distributed in the series "Mosses of Northern Bolivia").

The finely dissected fronds grow in large, densely intertangled pendent masses on tree trunks. Hieronymus' var. *contractum* is a reduced, densely hairy form, common in the higher mountains of Colombia. More distinct is the following:

6a. Hymenophyllum trichophyllum var. **buesii** Morton, var. nov.

A var. typica segmentis undulatis differt.

Differs from the typical variety in its obviously undulate segments.

Type in the U. S. National Herbarium, No. 1831537, collected at Abra Mirador, La Convención, Department of Cuzco, Peru, at an elevation of 3,150 meters, September 29, 1934, by C. Bües (No. 2076).

7. Hymenophyllum urbanii Brause, in Urban, Symb. Antill. 7: 484. 1913.

Rhizomes filiform, 0.2 mm. in diameter or less; fronds pendent, indeterminate; stipes 1–5 cm. long, filiform, less than 0.2 mm. in diameter, sparingly pilose, the hairs mostly simple, several-celled; blades linear, 4–15 cm. long, 1–2.5 cm. broad, the rhachis nonalate throughout; pinnae 9 to many pairs, petiolulate, 5–10 mm. long, 5–7 mm. broad (or some of them elongate and frondlike), obtuse, pinnatifid, the costa continuously winged on both sides (normally); segments 1–3 pairs, all simple and linear or the basal bifid, the ultimate segments 1.2 mm. broad or less; hairs of rhachis, veins, and margins numerous, all stellate, subsessile, 4–6-rayed, the rays mostly 0.5 mm. long or more; sori small, the indusia immersed at base, narrower than the segments, the valves about 0.5 mm. long and broad, long-ciliate, the hairs stellate, stalked.

TYPE: Loma Rosilla, Dominican Republic, *Fuertes* 1817 (isotype US).

RANGE: Cuba, Hispaniola, and Jamaica.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Summit of Pico Turquino, Sierra Maestra, *Ekman* 14540; *León* 11116.

HAITI: Massif de la Selle, at 2,100 meters elevation, *Ekman* H 7687.

JAMAICA: Higher parts of the Blue Mountains, at elevations of 1,650 to 2,200 meters: *Hart* 65; *Jenman;* J. P. 63; *Maxon* 1383, 2666, 2719, 9733, 9750, 9877, 10016, 10034; *Orcutt* 5371; *Underwood* 1018, 1474; *Shreve; Stoudt* 800; *Maxon & Killip* 1176.

In the Pteridophyta of Porto Rico (p. 506) Dr. Maxon stated that *H. urbanii* was identical with *H. antillense*, but examination of authentic material of both shows this to be incorrect. The two differ fundamentally in the presence of hairs on the leaf surfaces in *H. antillense* and their absence in *H. urbanii*. *H. antillense* may be distinguished also by the fact that the rhachis is alate upwardly, whereas that of *H. urbanii* is nonalate throughout. As a matter of fact, *H. urbanii* is very closely allied to the continental *H. trichophyllum* H. B. K. and may be only a variety of that species.

8. Hymenophyllum roraimense Morton, sp. nov.

Rhizoma filiforme; frondes indefinitae, pendulae, stipitibus brevibus, filiformibus, parce pilosis, pilis plerumque simplicibus; laminae oblongae vel lineares,

breves, rhachibus flexuosis, non alatis; pinnae paucae, breviter petiolulatae, simplices, bifidae vel simpliciter pinnatifidae, costa ubique alata, segmentis 1- (vel raro 2-) jugis, latis; pili in superficiebus nulli, in rhachibus, venis et marginibus stellati, subsessiles, 3–6-radiati, radiis elongatis; indusia basi immersa, segmentis angustiora, longe ciliata.

Rhizomes creeping, filiform, about 0.15 mm. in diameter; fronds pendent, indeterminate; stipes filiform, 1 cm. long or less, about 0.15 mm. in diameter, nonalate throughout, deciduously pilose, the hairs mostly simple; blades oblong to linear, 3–5 cm. long, 10–15 mm. broad, obtuse, the rhachis wiry, flexuous, nonalate throughout, glabrate; pinnae ascending, 6–8 pairs, all short-petiolulate, 3–9 mm. long, 3–5 mm. broad, simple, bifid, or simply pinnatifid with 1 or rarely 2 pairs of segments, the costa winged throughout; segments 1–1.8 mm. broad, 1-veined; hairs lacking on the leaf surfaces, those of the rhachis, veins, and margins all stellate, subsessile, 3–6-rayed, the rays elongate, over 0.5 mm. long; indusia slightly immersed at base, narrower than the segments, the valves about 0.5 mm. long and broad, glabrous externally, long-ciliate, the hairs stellate, stalked.

Type in the U. S. National Herbarium No. 1858489, collected on the upper slopes of Mount Roraima, British Guiana, December 1884, by Everard F. im Thurn (No. 375).

RANGE: Known only from Mount Roraima.

ADDITIONAL SPECIMEN EXAMINED:

BRITISH GUIANA: Mount Roraima, *im Thurn* 203.

9. Hymenophyllum tenerrimum v. d. Bosch, Ned. Kruid. Arch. 5³: 185. 1863.

Rhizomes filiform, 0.2 mm. in diameter; fronds determinate; stipes 0.5–1 cm. long, filiform, about 0.2 mm. in diameter, pilose, the hairs simple or forked, elongate, several-celled; blades ovate to linear, 3–5 cm. long, 0.8–1.5 cm. broad, the rhachis nonalate throughout; pinnae spreading, 7–13 pairs, sessile or the upper adnate, subflabellate, 4–9 mm. long, 4–5 mm. broad; segments 1 or 2 pairs, simple and 1-veined, about 1.5 mm. broad; hairs of rhachis forked or stellate, 3-rayed, long-stalked, absent from the veins, the marginal ones mostly 3-branched at base, the branches elongate (0.5 mm. long or more), sometimes forked at apex, or a few simple or once-forked at base; sori few, apical, slightly immersed at base, the valves rotund, 0.8 mm. long and broad, long-ciliate, the hairs simple or forked at base.

TYPE: Tarapoto, Peru, *Spruce* 4702.

RANGE: Peru and Bolivia.

SPECIMEN EXAMINED:

BOLIVIA: Songo, *Bang* (with 899 pp.) (NY).

This identification of *H. tenerrimum* depends on a note by Rusby on the label of the Bang specimen cited above, in which he states that the specimen is the same as *Spruce* 4702.

10. Hymenophyllum elegans Spreng. Syst. Veg. 4: 133. 1827.

Hymenophyllum cruegeri C. Müll. Bot. Zeit. 1854: 722. 1854. Type from Mount Tocuche, Trinidad, *Crueger* (fragment US).

Hymenophyllum delicatissimum Fée, Crypt. Vasc. Brés. 2: 83. *pl. 105, f. 1.* 1872–73. Type from the Organ Mountains, Brazil, *Glaziou* 3491 (isotype US).

Hymenophyllum caudatellum Christ, Bull. Herb. Boiss. II. 4: 939. 1904. Type from Costa Rica, *Wercklé* (isotype US).

Sphaerocionium elegans Copel. Phil. Journ. Sci. 67: 32. 1938.

Sphaerocionium cruegeri Copel. loc. cit.

Rhizomes creeping, filiform, about 0.2 mm. in diameter, sparingly hairy; fronds pendent, determinate; stipes 5–20 mm. long, filiform, 0.2 mm. in diameter,

nonalate, sparingly hairy, the hairs simple or forked; blades lanceolate to linear, 2–17 cm. long, 9–20 mm. broad, acuminate, the rhachis normally nonalate below, alate on one or both sides upwardly by the decurrent bases of the pinnae; pinnae spreading, 7–20 pairs, all sessile or adnate, subflabellate, 4.5–9 mm. long, 4–7 mm. broad, pinnatifid, the costa broadly winged; segments 1 or 2 (very rarely 3) pairs, all simple and 1-veined or the superior basal one bifid, the ultimate segments 1–1.5 mm. broad; hairs of the rhachis few, mostly forked, a few stellate, 3-rayed, long-stalked, the rays 1-celled, those of the veins few, mostly forked, those of the margins abundant, varied, mostly forked at base with elongate branches (0.5–0.8 mm. long) or twice-forked, a few simple, stellate, or bistellate; sori numerous, borne on all the upper segments of fertile fronds, the indusia scarcely immersed at base, not broader than the segments, the valves 0.7–1 mm. long, 1–1.4 mm. broad, conspicuously ciliate, the hairs mostly stellate, subsessile or a few long-stalked.

TYPE: Brazil, *Sello*.

RANGE: Cuba, Hispaniola, Guadeloupe, Grenada, Trinidad, Guatemala, Costa Rica, Panama, Colombia, Peru, Bolivia, and Brazil.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Sierra de Cristal, alt. 1,325 meters, *Ekman* 6828. Crest of Sierra Maestra, between Pico Turquino and La Bayamesa, alt. 1,350 meters, *Morton & Acuña* 3708.

DOMINICAN REPUBLIC: Lagunas de Cenobí, alt. 1,100 meters, *Ekman* H 12753. Loma Guita-Espuela, alt. 1,100 meters, *Ekman* H 12286. San Francisco de Macorís, *Abbott* 2057, 2120, 2177.

HAITI: Le Borgne, Massif du Nord, alt. 1,150 meters, *Ekman* H 4775.

GUADELOUPE: *Duss* 4268.

GRENADA: *Sherring*.

TRINIDAD: Mount Tocuche, *Broadway* 5655, 7109; *Britton et al.* 1374.

GUATEMALA: Trail from Senahú to Actalá, Alta Verapaz, *Maxon & Hay* 3329.

COSTA RICA: Navarro, alt. 1,500 meters, *Torres* 193. South of Cartago, alt. 1,800 meters, *Maxon* 496. El Muñeco, *Standley* 33646. Volcán Turrialba, *Standley* 35189. La Palma, *Standley* 32902; *Maxon & Harvey* 7966. Volcán Barba, *M. Valerio* 48.

PANAMA: Vicinity of El Boquete, Prov. Chiriquí, alt. 1,500–1,800 meters, *Cornman* 1244; *Killip* 5340.

COLOMBIA: Mesa de los Santos, Santander, alt. 1,500 meters, *Killip & Smith* 15342 (NY, US). La Sierra, Antioquia, alt. 2,000 meters, *Archer* 1650. Angostura de Armada, Nariño, *André* 3338 (NY).

PERU: Mountains at 3,000 meters elevation, *Lechler* (NY, US).

BOLIVIA: Apolo, alt. 1,500 meters, *Williams* 1238 (NY, US). Hacienda Simaco, on road to Tipuani, alt. 1,400 meters, *Buchtien* 5199.

BRAZIL: *Burchell* 3721 (G); *Riedel*. Rio Grande, São Paulo, *Brade* 6618. Serra de Paranapiacaba, São Paulo, *Brade* 8358 (NY). Between Tijuca and Pico de Papagaio, Rio de Janeiro, *Brade* (Mus. Nac. Rio Jan. 20613) (NY). Serra Pintoba, Espirito Santo, *Luetzelburg* 7103, 7203 (NY). Serra do Mar, Paraná, *Dusén* 3362 (G). Lages, Santa Catharina, *Spannagel* (Rosenst. exs. 448) (NY). Serra da Estrella, *Spannagel* 317 (NY). Alta da Serra, São Paulo, *Chase* 10712.

Like many other species of *Hymenophyllum*, *H. elegans* is exceedingly variable. The form described below probably represents merely depauperate plants.

10 a. Hymenophyllum elegans forma **minor** Morton, f. nov.

A f. **typica** pinnis plerumque simplicibus vel apice bifidis, segmentis latis, rhachibus usque ad vel fere usque ad basin alatis differt.

Differs from the typical form in having the pinnae mostly simple or merely bifid at apex, the segments broad, and the rhachis alate to base or nearly so.

Type in the New York Botanical Garden, collected in Sierra del Líbano, Santa Marta Mountains, Department of Magdalena, Colombia, at an elevation of 1,650 meters, by H. H. Smith (No. 1100).

This form appears to be restricted to Colombia and Venezuela, although somewhat similar ones occasionally occur elsewhere. The following additional specimens are referred here.

VENEZUELA: Colonia Tovar, *Fendler* 457 (G).

COLOMBIA: Mesa de los Santos, Santander, alt. 1,500 meters, *Killip & Smith* 15334 p. p. (NY, US). This collection contains some fronds of more or less typical *H. elegans*.

11. Hymenophyllum adiantoides v. d. Bosch, Ned. Kruid. Arch. **5**[1]: 184. 1863.

?*Hymenophyllum sprucei* Baker, in Hook. & Bak. Syn. Fil. 65. 1867. Type from Tarapoto, Peru, *Spruce*.

Rhizomes filiform, 0.2 mm. in diameter; fronds pendent, indeterminate; stipes 1–2 cm. long, filiform, 0.25 mm. in diameter, nonalate throughout, persistently pilose, the hairs mostly stellate, numerous, 3- or 4-rayed; blades linear, 4–10 cm. long, 1.5–2 cm. broad, acuminate at apex, the rhachis slender, black, narrowly alate upwardly, nonalate at base except for the slightly decurrent pinnae; pinnae spreading, 8–17 pairs, subrhombic, 0.9–1.1 cm. long, 0.5–0.7 cm. broad, obtuse, all adnate, the lowest free at lower base, pinnatifid; segments 3 or 4 pairs, the lower superior one or two bifid, the others simple, the ultimate lobes short, narrow, less than 1 mm. broad; hairs of the rhachis stellate, stalked, 5- or 6-rayed, or some of them twice-stellate, those of the veins stellate, stalked, 3–5-rayed, the marginal ones mostly stellate, stalked, mostly 3-rayed, or some bistellate, a few forked at base, the branches less than 0.5 mm. long; sori confined to the tips of the upper pinnae, slightly immersed at base, the valves ovate, obtuse, 1 mm. long or less, 0.7–1 mm. broad, glabrous externally, ciliate, the hairs partly simple, partly stellate.

TYPE: Tarapoto, Peru, *Spruce*.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED:

PERU: Tarapoto, *Spruce* (G, NY, US). These specimens are probably all isotypes. They bear the notation "conf. 4700," which may be the type number of *H. sprucei* Baker. No number was cited in the original description of either species.

12. Hymenophyllum hirsutum (L.) Swartz, Journ. Bot. Schrad. **1800**[2]: 99. 1801, as to name.

Trichomanes hirsutum L. Sp. Pl. 1098. 1753.

Trichomanes ciliatum Swartz, Prodr. Veg. Ind. Occ. 136. 1788.

Hymenophyllum ciliatum Swartz, Journ. Bot. Schrad. **1800**[2]: 100. 1801.

Sphaerocionium ciliatum Presl, Hymenoph. 34. 1843.

Sphaerocionium hirsutum Presl, loc. cit.

Sphaerocionium vestitum Presl, op. cit. 34, 58. Type from Rio de Janeiro, Brazil, *Beyrich*.

?*Sphaerocionium commutatum* Presl, op. cit. 34. Based on *Hymenophyllum boryanum* sensu Raddi, Pl. Bras. *pl. 35, fig. 4.* 1825, not Willd. 1810. This must be considered as a *nomen subnudum* at best, for Raddi's figure is too poor for positive identification.

Sphaerocionium grevilleanum Presl, loc. cit. Based on *H. ciliatum* sensu Hook. & Grev. Icon. Fil. **1**: *pl. 35.* 1829, not Swartz, which was figured from a plant collected in St. Vincent by Guilding. The plate represents nearly typical *H. hirsutum*.

Hymenophyllum remotum v. d. Bosch, Ned. Kruid. Arch. **4**: 413. 1859. Based on the same plate as *Sphaerocionium grevilleanum* Presl, and therefore a *nomen abortivum.*

?*Hymenophyllum commutatum* v. d. Bosch, op. cit. 414.

?*Hymenophyllum surinamense* v. d. Bosch, loc. cit. Based on *Sphaerocionium ciliatum* sensu Presl, Hymenoph. 34. 1843, as to plant of Weigelt from Surinam. A *nomen nudum*, placed here on the authority of Christensen.

Hymenophyllum gardnerianum Sturm, in Mart. Fl. Bras. **1**²: 297. 1859. Based on *Gardner* 213, from Rio de Janeiro, Brazil. Placed here on the authority of Christensen. This is probably, but not certainly, the correct disposition.

Hymenophyllum vestitum v. d. Bosch, Ned. Kruid. Arch. **5**²: 193. 1863.

Hymenophyllum gratum Fée, Mém. Foug. **11**: 118. *pl. 30, fig. 1–2.* 1866. Type from Guadeloupe, *L'Herminier* in 1861. A large form, perhaps varietally distinct.

Hymenophyllum elegantissimum Fée, op. cit. 118. *pl. 29, fig. 2.* Type from Guadeloupe, *L' Herminier* in 1861.

Hymenophyllum microcarpon Fée, Crypt. Vasc. Brés. **1**: 245. *pl. 69, fig. 3.* 1869, not *H. microcarpum* Desv. 1827. Based on *Glaziou* 2268 and 3356 from Rio de Janeiro, Brazil.

Hymenophyllum caulopteron Fée, op. cit. 197. *pl. 97, fig. 3.* Based on *Glaziou* 1713, 920, 2269, and 2270, from Brazil. A specimen of No. 920 is in the New York Botanical Garden.

Hymenophyllum fraseri Mett. ex Fourn. Mex. Pl. **1**: 63. 1872. A *nomen nudum*, based on specimens collected at Chinantla, Mexico, by Liebmann. Placed here on the authority of Christensen, but it may very well be *H. trapezoidale* Liebm., which came from the same locality.

Hymenophyllum ulei Christ & Giesenh. Flora **86**: 85. 1899; Bull. Herb. Boiss. II. **2**:320. 1902. Type from Santa Catharina, Brazil, *Ule* 4510.

Hymenophyllum elatius Christ in Schwacke, Pl. Nov. Mineiras **2**: 13. 1900; Bull. Herb. Boiss. II. **2**: 319. 1902. Type from Santa Catharina, Brazil, *Ule* 206.

Hymenophyllum ciliatum f. *tuberosum* Rosenst. Hedwigia **46**: 74. 1906. Based on *H. ulei* Christ & Giesenh.

Hymenophyllum ciliatum var. *abbreviatum* Rosenst. op. cit. **56**: 360. 1915. Type from Ribeira, São Paulo, Brazil, *Brade* 5169.

Sphaerocionium elegantissimum Copel. Phil. Journ. Sci. **67**: 34. 1938.

Rhizomes wide-creeping, 0.2–0.3 mm. in diameter, red-pilose; fronds erect, determinate; stipes 1.5–3 (rarely 5) cm. long, 0.3 mm. in diameter near base, conspicuously alate, normally at least to middle and frequently nearly to base, sparingly pilose, the hairs stellate, stalked, 4-rayed or more, some of them twice-stellate; blades ovate to oblong or oblong-lanceolate, 3–9 (rarely 15) cm. long, 1.5–3 cm. broad or rarely more, acute at apex, not reduced at base, the rhachis broadly alate throughout; pinnae 6–12 pairs, spreading, ovate to ovate-oblong, 7–15 mm. long, 5–12 mm. broad, obtuse, deeply pinnatifid, the costa broadly alate throughout; primary segments 2–5 pairs, all simple or the basal one or two bifid, the ultimate segments linear, up to 4 mm. long, 1–1.3 mm. broad; hairs of the rhachis stellate, stalked, 3- or 4-rayed, some of them twice-stellate, those of the veins scattered, stellate, long-stalked, 3- or 4-rayed, the marginal ones bi-stellate or twice-forked, the primary branches about 0.25 mm. long, the rays 0.25–0.4 mm. long; sori borne on most of the segments, about as broad as the segments, the valves suborbicular, about 1.5 mm. long and broad, rounded, glabrous externally, long-ciliate, the hairs mostly furcate at base, or sometimes twice-forked.

TYPE: Based on *Filicula digitata* Plumier, Fil. Amer. 73, *pl. 50B.* 1703, presumably a plant from the West Indies.

RANGE: West Indies, and Mexico to Bolivia and Brazil.

SPECIMENS EXAMINED:

CUBA: Common in the Sierra Maestra, at elevations of 800 to 1,500 meters: *Wright* 956, 3937; *Ekman* 1694, 8861; *Shafer* 9030; *Eggers* 5337; *Morton & Acuña* 3524; *Hioram & Maurel* 6035; *Hioram & Clément* 6363: *León, Clément & Roca* 10502. The Cuban form is uniformly small, the pinnae having mostly only two pairs of segments, or sometimes being merely bifid.

HAITI: At elevations of 630 to 2,200 meters: *Ekman* H 4859; *Leonard & Leonard* 14501, 14577, 15161; *Curtis* 37.

DOMINICAN REPUBLIC: At elevations of 250 to 1,000 meters: *Ekman* H 11453, H 12395; *Abbott* 1386, 2023, 2046, 2104.

JAMAICA: Common in the Blue Mountains at elevations from 600 to 1,750 meters: *Maxon* 1081, 9018, 9188, 9205, 9257, 9444, 9569, 9725, 10551, 10579; *Skutch* 164; *D. S. Johnson* 3; *Hart* 206; J. P. 68.

PUERTO RICO: *Hess* 222; *Sintenis* 6353; *Blomquist* 13139; *Wagner.*

ST. KITTS: The Crater, alt. 750 meters, *Box* 253. Mount Misery, *Britton & Cowell* 779.

GUADELOUPE: At elevations of 165 to 810 meters: *Duss* 4269, 4274, 4281; *Questel* 1044, 1846; *Stehlé* 1222.

DOMINICA: At elevations of 750 to 1,400 meters: *Hodge & Hodge* 158, 159, 2825; *Cooper* 106a; *Haweis* 1.;

MONTSERRAT: Chaner's Mountain, alt. 600 meters, *Shafer* 767, 768, 774.

MARTINIQUE: *Duss* 1514, 1516; *Stehlé* 5380.

ST. LUCIA: Roseau-Millette Ridge, alt. 750 meters, *Box* 519.

ST. VINCENT: *H. H. & G. W. Smith* 445; *Eggers* 6852 p. p., 6902.

GRENADA: *Murray & Elliott; Sherring.* Grand Etang, *Broadway* s. n., 2535; *Miller.*

TRINIDAD: *Fendler* 86. Mount Tocuche, *Britton et al.* 1377, 1378, 1379, 1380; *Broadway* 5638. Mora Forest, *Britton & Hazen* 375. Morne Bleu, *E. G. Britton* 2289. Valencia, *Britton & Britton* 2109. Aripo, *Broadway* 9978. Blanchisseuse Road, *Broadway* 5811.

TOBAGO: Caledonia, *Broadway* 4541.

MEXICO: States of Puebla and Oaxaca, at elevations of 1,500 to 2,100 meters: *Barnes & Land* 497a; *Mexia* 9277 p. p.

GUATEMALA: Departments of Izabal, Chiquimula, and Alta Verapaz, from sea level to an elevation of 1,500 meters: *Maxon & Hay* 3212; *Cook & Doyle* 39; *von Tuerckheim* II. 1847, II. 1849, II. 1851, Donn. Smith 8031, 8805; *H. Johnson* 174, 362; *Hatch & Wilson* 18, 102; *Steyermark* 31568, 39378.

HONDURAS: Quebrada Mojanales, *Blake* 7475.

NICARAGUA: Sangsangta District, *Schramm* 24, 34, 39.

COSTA RICA: *Wercklé.* Between El General and Buenos Aires, *Pittier* 3552. Diquís, *Pittier* (Herb. Nat. Cost. 12109).

BRITISH GUIANA: *Jenman* s. n. (NY, US), *Schweinitz* (NY). Kamakusa, *de la Cruz* 2786 (NY, US). Kaieteur Falls, *Tutin* 532.

FRENCH GUIANA: Oyapok, *Leprieur* in 1836 (G, US).

VENEZUELA: Colonia Tovar, *Fendler* 37 (G, NY). Cerro Santa Ana, Paraguana Peninsula, *Curran & Haman* 679 (G, NY, US). Imataca Mountains, *Thompson* 17. South of Santa Catalina, *Dort* (NY). Without locality, *Moritz* 266b (G).

COLOMBIA: At elevations of 5 to 900 meters: Panuré, *Spruce* 2974. Puerto Berrio, Santander, *Haught* 1795 (G, US). Barranca Bermeja, Santander, *Haught*

2078. Between Pueblo Viejo and San Miguel, Magdalena, *Seifriz* 329. Río Calena, El Valle, *Cuatrecasas* 16291a. Cerro Chiribiqueta, Vaupes, *Schultes* 5637.

ECUADOR: Canton Mera, Napo-Pastaza, *Mexia* 7021.

PERU: Departments of Cuzco, Loreto, and Huánuco, at elevations of 350 to 1,650 meters: *Mexia* 8145 (NY, US), 6288a (G, NY, US); *Killip & Smith* 28539 (NY, US); *Bües* 2139.

BOLIVIA: At elevations of 850 to 1,500 meters: Tumapasa, *Cárdenas* 1976 (NY, US). San Carlos, Mapiri, *Buchtien* 68 (NY). Hacienda Simaco, *Buchtien* 5212.

BRAZIL: Common in the states of Pará, Minas Gerais, Rio de Janeiro, and São Paulo: *Burchell* 3560 (G); *Webb* (NY); *Wacket* (Rosenst. exs. 327), 109 (NY); *Brade* 5225 (NY), 6283 (NY), 8326; *Glaziou* 4441, 7272 (NY); *Mexia* 4299 (G, NY, US); Tanaii, *Spruce* (G, US).

As may be judged from the extensive synonymy given above, this is one of the most variable species. A detailed monographic study of the variations might show that the large, robust form of southern Brazil, described as *H. caulopteron* Fée, *H. elatius* Christ, *H. ulei* Christ & Giesenh., and *Sphaerocionium vestitum* Presl, could be recognized at least varietally, but at present I am unable to separate it satisfactorily from the numerous other variants of this complex species. It is represented by the following collections (from Santa Catherina, São Paulo, Rio de Janeiro, and Paraná): *Schmalz* 174 (NY); *Brade* 5858 (NY); *Sampaio* 2566 (NY, US); *Ule* (Mus. Nac. Rio Jan. 200) (NY); *Dusén* 713, 3447 (NY); *Vauthier* 672 (G); *Burchell* 3720 (G); Wilkes Exped. 2 (G, NY, US).

A form occurs in the Galápagos Islands (Chatham Island, *Stewart* 898) that can be referred only to this species at present, although it has long stipes, only slightly alate at apex, and many of the marginal hairs simple.

It is exceedingly unfortunate that the well-known name *H. ciliatum* must be displaced, but there seems no help for it. For a discussion of the nomenclature see page 173.

13. Hymenophyllum prionema Kunze, in Mart. Fl. Bras. 1^2: 284. 1859.

Rhizomes capillary, 0.33 mm. in diameter, ferruginous-hairy; stipes filiform, 2.5–3.7 cm. long, 0.33 mm. in diameter, nonalate throughout; blades linear, 11–15 cm. long, about 2.5 cm. broad, the rhachis flexuous, very narrowly alate; pinnae remote, 8–20 pairs, ovate-oblong, obtuse, up to 1.2 cm. long and 6 mm. broad, broadly adnate at upper base, decurrent at lower, deeply pinnatifid, the pinnules oblong, obtuse, bifid or trifid, 4 mm. long, 2 mm. broad, the ultimate segments linear, 2 mm. long, scarcely 1 mm. broad; hairs absent from leaf surfaces and veins above, those of the veins of the lower surface and margins simple, mostly 3-celled; sori borne in upper part of frond, the valves ovate, 2 mm. long, incised-lacerate.

Type: Marajo, Pará, Brazil, *Martius*.

RANGE: Known only from the type.

The above description has been compiled from the original.

14. Hymenophyllum semiglabrum Rosenst. Repert. Sp. Nov. Fedde **9**: 67. 1910.

Sphaerocionium semiglabrum Copel. Phil. Journ. Sci. **67**: 34. 1938.

Rhizomes filiform, 0.2 mm. in diameter; fronds pendent, determinate; stipes filiform, 1–4 cm. long, 0.25 mm. in diameter, nonalate throughout, sparingly pilose, the hairs all simple; blades ovate to ovate-lanceolate, 2–6 cm. long, 1–2 cm. broad, acuminate at apex, the rhachis alate throughout or the base nonalate, not flexuous; pinnae 3–8 pairs, oblong, ascending, 1–1.7 cm. long, 5–8 mm. broad, deeply pinnatifid; segments all simple, or the basal superior one bifid, the ultimate segments linear, 1-veined, 1.2–2 mm. broad; hairs lacking on the upper side of

the frond, those of the rhachis and veins beneath simple or rarely forked at base, the marginal ones almost all simple, a few basally forked; sori mostly apical, scarcely immersed at base, the valves oval, 1.5 mm. long, 1 mm. broad, rounded, sparingly ciliate, the hairs simple.

TYPE: La Palma, Costa Rica, *A. & C. Brade* 395 (fragment US).

RANGE: Costa Rica and Panama, at elevations of 1,000 to 1,500 meters.

ADDITIONAL SPECIMEN EXAMINED:

PANAMA: El Boquete, region of Volcán Chiriquí, *Cornman* 1175.

15. Hymenophyllum silvaticum Morton, sp. nov.

Rhizoma repens, parce pilosum; frondes parvae, definitae, stipitibus perbrevibus, non alatis, parce pilosis, pilis simplicibus vel furcatis; laminae linearilanceolatae, acuminatae, rhachibus fere usque ad basim alatis, ala angusta, ciliata, non undulata; pinnae infimae sessiles, alterae adnatae, pinnatifidae, segmentis 3 vel 4, omnibus simplicibus, linearibus, uninerviis; pili supra nulli, in rhachibus subtus pauci, furcati, in venis et superficiebus inferioribus nulli, in marginibus pauci, simplices, patentes; sori segmentis paullo latiores, basi subimmersi, valvis ovatis, acutiusculis, longe ciliatis, pilis simplicibus.

Rhizomes wide-creeping, about 0.25 mm. in diameter, sparingly pilose; fronds determinate; stipes very short, 1.5–4 mm. long, about 0.15 mm. in diameter, nonalate, sparsely pilose, the hairs simple or forked; blades linear-lanceolate, 2.5–5 cm. long, 1–1.5 cm. broad, acuminate at apex, truncate at base, the rhachis straight, alate nearly or quite to base, the wing narrow, about 0.25 mm. broad, not undulate; pinnae 7–16 pairs, slightly ascending, 3–8 mm. long, 2–4 mm. broad, obtuse, the lowermost sessile, the others adnate, deeply pinnatifid; segments 3 or 4, all simple, linear, 1-veined, up to 3 mm. long, 0.7–1 mm. broad; hairs lacking on the upper side of the frond, those of the rhachis beneath few, forked, lacking on the veins and leaf surfaces beneath, the marginal ones few, all simple, spreading, about 0.4 mm. long; sori borne on all the segments of fertile pinnae, the indusia a little broader than the segments, slightly immersed at base, the valves ovate, acutish, entire, about 1.2 mm. long, 0.8 mm. broad, glabrous on sides, long-ciliate, the hairs all simple, 1-celled.

Type in the U. S. National Herbarium, No. 1189915, collected along the Río Caballete, Santa Rosa, Department of El Valle, Colombia, in forest, at 200 to 300 meters elevation, September 22, 1922, by E. P. Killip (No. 11557). Isotype at the New York Botanical Garden.

16. Hymenophyllum sampaioanum Brade & Rosenst. Bol. Mus. Nac. Rio Jan. **7**[3]: 136. *pl. 1, f. 2, pl. 3, f. 1.* 1931.

Sphaerocionium sampaioanum Copel. Phil. Journ. Sci. **67**: 33. 1938.

Rhizome capillary, about 0.1 mm. in diameter; fronds scattered, determinate; stipes capillary, 1–5 mm. long, 0.1 mm. in diameter, alate at apex, sparsely pilose, the hairs simple or forked; blades ovate or subflabellate, 0.5–1.5 cm. long, 5–8 mm. broad, rounded at apex, the rhachis broadly winged throughout; segments 3 or 4 pairs, all simple or the lowest bifid, very broad, about 1.5 mm. wide, not undulate; hairs of the rhachis few, forked or stellate, 3- or 4-rayed, subsessile, those of the veins few or none, simple, elongate or rarely forked, the stalk short, the rays elongate, the marginal ones few, simple or rarely forked at base, over 0.5 mm. long, all the hairs very delicate; sori apical, the indusia much narrower than the segments, slightly immersed at base, the valves suborbicular, 1.2 mm. long and broad, rounded at apex, long-ciliate, the hairs simple.

TYPE: Theresopolis, Rio de Janeiro, Brazil, alt. 1,450 meters, *Brade* 9881 (Herb. Mus. Nac. Rio Jan. 20559) (isotype NY).

RANGE: Known only from the type collection.

17. Hymenophyllum crispum H. B. K. Nov. Gen. & Sp. **1**: 26. 1815.

Sphaerocionium schiedeanum Presl, Hymenoph. 60. 1843. Type from Mexico, *Schiede*. Placed here from description.

Sphaerocionium crispum Klotzsch, Linnaea **1**: 537. 1844 (excl. var. *amoenum*).

Sphaerocionium crispum var. *pilosum* Klotzsch, loc. cit. (the typical variety).

Hymenophyllum schiedeanum v. d. Bosch, Ned. Kruid. Arch. **4**: 414. 1859.

Hymenophyllum orbignianum v. d. Bosch, Ned. Kruid. Arch. **5**[3]: 191. 1863. Type from Youracares, Bolivia, *D'Orbigny* 304. Placed here from description.

? *Hymenophyllum divaricatum* v. d. Bosch, op. cit. 190. Type from Venezuela, *Moritz*.

Hymenophyllum crispum var. *brasilianum* Fée, Crypt. Vasc. Brés. **1**: 195. *pl. 71, f. 2.* 1869. Type from the Organ Mountains, Brazil, *Glaziou* 3347.

? *Hymenophyllum kaieteurum* Jenman, W. Ind. & Guiana Ferns 15. 1898. Type from the Potaro River, British Guiana, *Jenman*. There does not seem to be a specimen in the Jenman Herbarium at the New York Botanical Garden.

Hymenophyllum constrictum Christ, Bull. Herb. Boiss. II. **4**: 939. 1904. Type from Costa Rica, *Wercklé* (isotype US).

Hymenophyllum brasilianum Rosenst. Hedwigia **46**: 73. 1906.

Mecodium constrictum Copel. Phil. Journ. Sci. **67**: 25. 1938.

Hymenophyllum elegantissimum auctt., non Fée.

Rhizomes filiform, 0.2 mm. in diameter, sparingly hairy; fronds prostrate or pendent, determinate; stipes 0.5–5 cm. long, filiform, 0.2–0.3 mm. in diameter, narrowly and inconspicuously alate at apex, sparingly pilose, the hairs simple or a few forked, delicate; blades ovate to linear, 5–18 cm. long, 1.5–5 cm. broad, the lowest pinnae reduced, the rhachis alate throughout, the wing conspicuously undulate-crispate; pinnae 10–25 pairs, spreading or ascending, 1–2.5 cm. long, 5–12 mm. broad, deeply pinnatifid, the costa broadly alate, the wing undulate; segments 2–5 pairs, simple or the lower rarely bifid, 1–1.5 (rarely 2) mm. broad, conspicuously undulate-crispate; hairs of the rhachis few, forked or stellate, 3-rayed, stalked, those of the veins few, forked or stellate, 3- or 4-rayed, stalked, delicate, the marginal ones few, simple or rarely forked at base, elongate, 0.5 mm. long or more, very rarely the rays again forked at apex; indusia mostly as broad as or broader than the segments, scarcely immer ed at base, the valves suborbicular, 1.2–1.5 mm. long and broad, long-ciliate, the hairs simple, mostly 2-celled, and geniculate.

TYPE: Silla de Caracas, Venezuela, *Humboldt*.

RANGE: Jamaica, Mexico, Guatemala, Costa Rica, and Venezuela to Bolivia and Brazil.

ADDITIONAL SPECIMENS EXAMINED:

JAMAICA: Blue Mountains, at elevationss of 1,500 to 1,950 meters: *Maxon* 2746, 2755, 9707, 9720, 9820, 9840; *Maxon & Killip* 965; *Couch; Webster & Goldberg* 248; *Johnson; Hart* 203, 372.

MEXICO: Teotepec, Guerrero, *Hinton* 14306a.

GUATEMALA: Department of San Marcos, at elevations of 1,800 to 3,000 meters: *Standley* 66242; *Steyermark* 36060, 36444, 36780.

COSTA RICA: Irazú, *Standley* 35403. Colinegro, *Zeledón*. Las Nubes, *Standley* 38830.

COLOMBIA: Santa Elena, Medellín, Antioquia, *Henri-Stanislas* 1685.

PERU: Department of Cuzco, at elevations from 2,100 to 3,000 meters, *Bües* 719, 1813.

BOLIVIA: Tocarano Valley, *Herzog* 3831. Pelichuco, alt. 2,700 meters, *Williams* 2606 (NY, US).

BRAZIL: States of Rio de Janeiro, Santa Catherina, and Rio Grande do Sul: *Juergens* 135 (NY), s. n. (Rosenst. exs. 255) (NY, US), s. n. (Rosenst. exs. 159); *Brade* 6432 (NY, US); *Spannagel* 123 (NY), s. n. (US); *Luetzelburg* 6363.

17a. Hymenophyllum crispum var. **bipinnatisectum** Morton, var. nov.

A var. typica pinnulis usque ad 8-jugis, infimis profunde pinnatisectis differt.

Differs from the typical variety in having the pinnules up to 8 pairs, the lower deeply pinnatisect rather than simple or merely trifid.

Type in the U. S. National Herbarium, No. 1515594, collected at Alturas de Sieve, Department of Cuzco, Peru, at an elevation of 3,000 meters, June, 1924, by C. Bües (No. 1580). An additional specimen, collected at the same locality, is *Bües* 1528.

The present species, because of its undulate-crispate blades, could be confused only with *H. valvatum*, which, however, is much less strongly undulate and has a much stouter stipe (0.5–0.7 mm. in diameter, rather than 0.2–0.3 mm.), normally nonalate at apex. The blade of *H. valvatum* is usually broad and subtruncate at base.

The name *H. crispum* has been misapplied frequently to a conspicuously crispate, glabrous, West Indian plant of the section *Mecodium*, the proper name of which is doubtful, whereas the true *H. crispum* has, following Jenman, been passing erroneously as *H. elegantissimum* Fée, which is only one of the numerous forms of *H. hirsutum*.

18. Hymenophyllum valvatum Hook. & Grev. Icon. Fil. **2**: *pl. 219*. 1831.

Hymenophyllum francavillei v. d. Bosch, Ned. Kruid. Arch. **4**: 411. 1859. Type from Guadeloupe, *Perrottet*.

Hymenophyllum platylobum v. d. Bosch, op. cit. **5**[1]: 189. 1863. Type from San Gaván, Peru, *Lechler* 2498.

? *Hymenophyllum producens* Fée, Crypt. Vasc. Brés. **1**: 196. *pl. 71. f. 4*. 1869. Type from the Organ Mountains, Brazil, *Glaziou* 3349. Referred here by Christensen, but it seems a doubtful synonym. Fée's description and figure are too poor to be conclusive.

Sphaerocionium valvatum Copel. Phil. Journ. Sci. **67**: 31. 1938.

Rhizomes wide-creeping, 0.3–0.4 mm. in diameter; fronds erect, determinate; stipes 2–7.5 cm. long, 0.5–0.7 mm. in diameter, normally nonalate but occasionally alate at apex, sometimes on one side only, sparsely pilose, the hairs simple or forked; blades ovate-lanceolate, 4–15 cm. long, 3–5 (or rarely 8?) cm. broad, acuminate, the rhachis alate throughout, the wing 0.6–1 mm. broad, lightly undulate; pinnae spreading, 8–23 pairs, ovate, 1.5–2.5 cm. long, 1–1.5 cm. broad, deeply pinnatifid, the costa broadly winged; segments 4–6 pairs, the lower mostly quadrifid, the upper simple, the ultimate segments 1.2–1.5 mm. broad, undulate-crispate; hairs absent from the veins and costae above, those of the rhachis simple or forked, those of the veins beneath few, simple or a few once-forked at base or upwardly, the marginal ones few, simple or forked at base; sori numerous, borne on both apical and basal pinnules, the indusia not immersed at base, broader than the segments, the valves ovate, acutish, about 1.5 mm. long, 1 mm. broad, sparingly ciliate, the hairs all simple.

TYPE: Esmeraldas, Ecuador, alt. 1,200 meters, *Jameson*.

RANGE: Guadeloupe, Martinique, Colombia, Ecuador, Peru, Bolivia, and Brazil (?).

SPECIMENS EXAMINED:

MARTINIQUE: Pitons du Corbet, alt. 900 meters, *Stehlé* 2248, 3405.

GUADELOUPE: Rivière Dauriac, alt. 780 meters, *Stehlé* 2052. Massif Central, *Questel* 1028.

COLOMBIA: Cali, El Cauca, alt. 2,000 meters, *Lehmann* 1979. Río Margua, Norte de Santander, alt. 900–1,240 meters, *Cuatrecasas* 13390.

ECUADOR: At elevations of 1,400 to 1,800 meters: *Jameson* 12 (NY). Anque, *Lehmann* 124. Río Palora, *Rimbach* 13, 77. Río Toachi, *Sodiro.*

BOLIVIA: Hacienda Simaco, on road to Tipuani, alt. 1,400 meters, *Buchtien* 5200 (NY, US). Songo, *Bang* 897.

19. Hymenophyllum microcarpum Desv. Mém. Soc. Linn. Paris **6**: 333. 1827.

Hymenophyllum beyrichianum Kunze, Linnaea **9**: 108. 1834. Type from Pampayacu, Peru, *Poeppig.*

Hymenophyllum organense Hook. Sp. Fil. **1**: 90. *pl. 32B.* 1844. Type from the Organ Mountains, Brazil, *Gardner* 210.

Hymenophyllum pteropodum v. d. Bosch, Ned. Kruid. Arch. **5³**: 187. 1863. Cotypes from Quito, Ecuador, *Cuming* 23 and *Jameson* 109.

Hymenophyllum lindigii Mett. Ann. Sci. Nat. Paris V. **2**: 197. 1864. Type from Fusugasugá, Cundinamarca, Colombia, *Lindig* 122.

Hymenophyllum notabile Fée, Crypt. Vasc. Brés. **1**: 193. *pl. 69. f. 2.* 1869. Cotypes from Brazil, *Glaziou* 1714 and 2271.

Hymenophyllum contractile Sodiro, Crypt. Vasc. Quit. 22. 1893. Type from Nanegal, Ecuador, *Sodiro* (fragment US).

Hymenophyllum angustifrons Christ, Bull. Herb. Boiss. II. **4**: 940. 1904. Cotypes from Costa Rica, *Pittier* (Herb. Nat. Cost. 10984) (US), and Colombia, *Lehmann* 6414 (US).

Mecodium microcarpum Copel. Phil. Journ. Sci. **67**: 25. 1938.

Sphaerocionium microcarpum Copel. op. cit. 34.

Rhizomes creeping, 0.3–0.5 mm. in diameter; fronds erect, determinate; stipes 3–9 cm. long, 0.5 mm. in diameter or more, terete at base, broadly alate upwardly, pilose, the hairs stellate, 3- or 4-rayed, stalked, the stalks inflated; blades ovate to ovate-lanceolate, 7.5–20 cm. long, 4–10 cm. broad, acuminate at apex, subtruncate at base, the rhachis broadly alate throughout; pinnae spreading or ascending, 12–14 pairs, adnate, ovate-lanceolate, 2–5 cm. long, 9–18 mm. broad, deeply pinnatifid, the costa broadly alate; pinnules 4–8 pairs, usually deeply pinnatifid (rarely only bifid), the segments 2 or 3 pairs, the ultimate segments narrow, 1–1.5 mm. broad; hairs lacking on upper side of the frond, those of the rhachis stellate, 3–5-rayed, stalked, coarse, those of the veins beneath forked or stellate, 3-rayed, stalked or subsessile, or often simple, those of the margins almost all simple, reflexed, a few basally forked; sori borne only on the upper pinnules, the valves ovate to oblong, 1.2–1.4 mm. long, about 0.8 mm. broad, acutish, entire or denticulate, naked or sparingly ciliate, the hairs short, simple.

TYPE: Hispaniola, without collector's name (photograph US).

RANGE: Greater Antilles; Guatemala to Bolivia and Brazil.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Sierra Maestra, at elevations of 1,200 to 1,725 meters: *Morton & Acuña* 3706; *Ekman* 7173; *Clément* 1398 p.p.

DOMINICAN REPUBLIC: Barahona, *Fuertes* 1448b, 1510 p.p.

HAITI: Mountains, at elevations of 1,150 to 1,450 meters: *Ekman* H 2547, H 4869, H 5452, H 7377; *Leonard* 4531; *Cook* 30.

JAMAICA: Blue Mountains, at elevations of 1,000 to 1,500 meters: *Hart* 248; *Maxon* 1233, 2779; *Orcutt* 5279; *D. S. Johnson* 1; J. P. 73; *Watt* 167; *Chrysler* 1746.

PUERTO RICO: Sierra de Naguabo, Mount Morales, and Alta de Bandera, at elevations of 600 to 1,000 meters: *E. G. Britton* 7680; *Shafer* 2329, 3312, 3355; *Britton & Marble* 1075; *Hess* 308; *Stevenson* 1552; *Chase* 6469b.

GUATEMALA: Department of Alta Verapaz, at elevations of 750 to 1,600 meters: *von Tuerckheim* 650, II. 1984, II. 1985; *Johnson* 151, 534, 811, 926;

Hatch & Wilson 91, 98, 183, 199, 269; *Standley* 71661; *Wilson* 216, 220, 233; *Pittier* 317; *Cook & Griggs* 60.

NICARAGUA: Omotepec, *C. Wright.*

COSTA RICA: Common at elevations of 1,100 to 1,900 meters: *J. J. Cooper* (Donn. Smith 6020); *Tonduz* (Herb. Nat. Cost. 13341); *Wercklé; Valerio* 42; *Torres* 94; *Maxon* 238; *Standley* 33639, 39692, 39744, 39750, 39875, 39881.

PANAMA: Region of Volcán Chiriquí, at elevations of 1,400 to 1,650 meters: *Maxon* 5566; *Killip* 5048, 5397.

VENEZUELA: Colonia Tovar, *Fendler* 33; *Moritz* 269 (NY).

COLOMBIA: Departments of Magdalena, Santander, Cundinamarca, Antioquia, El Cauca, El Valle, Tolima, El Chocó, and Caquetá, at elevations of 200 to 3,000 meters: *H. H. Smith* 2249; *Dawe* 323; *Killip & Garcia* 35645; *Ariste Joseph; Henri-Stanislas* 1655; *Apollinaire & Arthur* 27 p. p.; *Archer* 1332; *Mutis* 3207; *Holton* 73 (NY); *Schlim* 857 (G); *Killip & Hazen* 11141, 11148 (NY, US); *Killip & Smith* 16143 (G, NY, US); *Killip* 7719, 11228 (NY, US), 35267; *Lehmann* 1978, 2210, 3055, B. T. 745 (NY); *Cuatrecasas et al.* 12449.

ECUADOR: At elevations of 360 to 2,100 meters: *Mexia* 6928, 6931 (G, US); *Skutch* 4461; *Rimbach* 78; *Jameson* 219 (G), s. n. (US).

PERU: Departments of Junín and Cuzco, at elevations of 1,300 to 2,700 meters: *Bües* 1911, 1913, 2018, 2035; *Herrera* 3010; *Schunke* 463, 1491, 1559, A 244; *Vargas* 3294.

BOLIVIA: At elevations of 1,100 to 1,800 meters: *Tate* 1061 (NY); *Rusby* 137 (G, NY, US); *Bang* 555 (NY); *Williams* 1234 (NY, US); *Buchtien* 3564, 5198 (G, NY, US), 5213, 5292, 5931.

BRITISH GUIANA: Mount Roraima, *im Thurn* 206, 371; *Tate* 499 (NY).

BRAZIL: States of Rio de Janeiro, São Paulo, and Paraná: *Brade* 8356 (NY); *Hoehne* 752 (NY); *Wacket* (Rosenst. exs. 65); *Dusén* 6773; *Rose & Russell* 20771 (NY, US).

The form of southern Brazil described as *H. notabile* and *H. organense* is large and has the stipe only slightly alate at apex, but it does not appear sufficiently distinct to merit recognition. Forms with nearly nonalate stipes occasionally occur elsewhere, e. g., *Schunke* 1491 and 1559, cited above.

19a. Hymenophyllum microcarpum var. lanceolatum Morton, var. nov.

A var. typica laminis lineari-lanceolatis, angustissimis, pinnis simplicioribus, inferioribus pinnatifidis, segments basalibus bifidis, alteris simplicibus differt.

Differs from the typical variety in having the blades linear-lanceolate, very narrow (15–22 mm. broad, 8–10 cm. long), the pinnae less divided, the lower simply pinnatifid, the basal segments bifid, and the others simple.

Type in the U. S. National Herbarium, No. 1643791, collected at Vara Blanca de Sarapiquí, on the north slope of the Central Cordillera, between Volcán Poás and Volcán Barba, Costa Rica, at an elevation of 1,340 meters, February 1938, by Alexander F. Skutch (No. 3639).

20. Hymenophyllum consanguineum Morton, sp. nov.

Rhizoma longe repens, crassum, dense ferrugineo-villosum; frondes erectae, definitae, stipitibus elongatis, nonalatis, parce pilosis, pilis simplicibus vel stellatis pauciradiatis; laminae ovatae vel ovato-lanceolatae, magnae, tripinnatifidae vel quadripinnatifidae, rhachibus ubique alatis; pinnae ovatae vel lanceolatae, sessiles, basi inferiore non alatae, pinnulis alte partitis, segmentis ultimis linearibus, angustis, interdum subundulatis; pili supra nulli, subtus in rhachibus simplices vel furcati, crassi, vel pauci stellati, 3-radiati, breviter stipitati, in venis simplices vel furcati, in marginibus pauci, simplices, reflexi; valvae ovatae, subacutae, glabrae vel parce ciliatae, pilis simplicibus.

Rhizomes long-creeping, 0.7–1 mm. in diameter, densely ferruginous-villous; fronds erect, determinate; stipes elongate, 5–10 cm. long, 0.6–1 mm. in diameter,

nonalate throughout, pilose, the hairs partly simple, coarse, partly stellate, few-rayed, stalked; blades ovate to ovate-lanceolate, 8–15 cm. long, 6–10 cm. broad, acuminate at apex, tripinnatifid to quadripinnatifid, the rhachis alate throughout, slightly flexuous; pinnae spreading, 9–15 pairs, ovate to lanceolate, 3–6 cm. long, 1.5–2.5 cm. broad, the lowest with nonalate lower base, the costa narrowly winged; segments 7–10 pairs, ovate to lanceolate, deeply once or twice parted, the ultimate segments linear, narrow, about 1 mm. broad; hairs confined to the lower side of the frond, those of the rhachis simple or forked, coarse, or a few stellate, 3-rayed, short-stalked, those of the veins simple or forked (either basally or upwardly), the marginal ones all simple or basally forked, coarse, reflexed; sori numerous, the valves ovate to oblong, acutish, 1.4–1.8 mm. long, glabrous or sparingly ciliate, the hairs all simple.

Type in the U. S. National Herbarium, No. 676067, collected along upper Caldera River, near "Camp I," Holcomb's Trail, above El Boquete, Province of Chiriquí, Panama, in humid forest between 1,450 and 1,650 meters elevation, March 22–24, 1911, by William R. Maxon (No. 5624).

RANGE: Costa Rica and Panama, at elevations of 1,450 to 2,268 meters.

ADDITIONAL SPECIMENS examined:

COSTA RICA: Santa Clara de Cartago, *Maxon & Harvey* 8212.

PANAMA: Type locality, *Killip* 5268. Between Alto de las Palmas and top of Cerro de la Horqueta, Chiriquí, *Maxon* 5447a, 5453, 5470.

The present species is perhaps too closely allied to *H. microcarpum*, from which it may be distinguished chiefly by its nonalate stipes. Also, the lower pinnae are nonalate at the lower base. *Hymenophyllum surbrigidum* is also related, but it may be distinguished by the smaller, rounded indusia and the rhachis being nonalate toward base.

21. Hymenophyllum glaziovii Baker, in Hook. Icon. Pl. **17**: *pl. 1612*. 1886.

Rhizomes filiform, 0.2–0.3 mm. in diameter; fronds pendent; stipes 2–7.5 cm. long, 0.2–0.4 mm. in diameter, very narrowly and inconspicuously alate toward apex, the wing 0.1 to rarely 0.4 mm. broad, sparingly pilose, the hairs mostly stellate, 3-rayed, or some merely forked; blades linear-lanceolate, 6–15 cm. long, 1.5–3 cm. broad, acuminate at apex, the rhachis narrowly alate throughout; pinnae ascending, 9 or 10 pairs, ovate-lanceolate, 1–3 cm. long, 3–12 mm. broad, narrowed to a petiole-like base, deeply pinnatifid, the costal wing about 0.4 mm. broad; segments 3 or 4 pairs, the lowest superior one up to 11 mm. long, simple on small plants, mostly bifid or quadrifid, the upper ones simple, the ultimate segments linear, up to 4 mm. long, about 1 mm. broad; hairs of the rhachis stellate, mostly 4-rayed, short-stalked, those of the veins few, stellate, 3- or 4-rayed, short-stalked, or a few forked, the marginal ones variable, mostly twice-forked or bistellate, the primary branches about 0.2 mm. long, the rays elongate, about 0.5 mm. long; sori borne on all segments of fertile pinnae, the indusia about as broad as the segments, deeply immersed at base, the valves suborbicular, 1.3–1.5 mm. long, about 1.5 mm. broad, glabrous externally, long-ciliate, the hairs mostly simple, 2-celled and geniculate, sometimes furcate.

TYPE: Rio de Janeiro, Brazil, *Glaziou* 7890.

RANGE: Brazil.

SPECIMENS EXAMINED:

BRAZIL: Santos, São Paulo, *Mosén* (Regnell 3101) (G, US).

22. Hymenophyllum hirtellum Swartz, Journ. Bot. Schrad. **1800**[2]: 101. 1801.

Trichomanes hirtellum Poir. in Lam. Encycl. **8**: 76. 1808.

Sphaerocionium hirtellum Presl, Hymenoph. 34. 1843.

Rhizomes wide-creeping, 0.4–0.5 mm. in diameter, densely red-pilose; fronds determinate; stipes 3–10 cm. long, 0.3–0.7 mm. in diameter, very narrowly and

inconspicuously alate at very apex, densely, conspicuously, and persistently pilose, the hairs forked or stellate and 3-rayed; blades ovate to ovate-lanceolate, 7–22 cm. long, 3–7 cm. broad, acute at apex, narrowed toward base, the rhachis narrowly alate throughout, the wing about 0.25 mm. broad; pinnae ascending, 7–16 pairs, ovate-lanceolate to linear-lanceolate, 2–7 (rarely 10) cm. long, 10–18 mm. broad, acuminate at apex, excavate at lower base, adnate at upper base, deeply pinnatisect; pinnules 5–10 pairs, ovate to oblong, 1–1.5 (rarely 2) cm. long, the lower deeply pinnatifid, with 2 or 3 pairs of segments, the ultimate segments linear, 2.5–5 mm. long, about 1 mm. broad; hairs of the rhachis stellate, stalked, 4- or 5-rayed, those of the veins scattered, forked or stellate and 3- or 4-rayed, stalked, the marginal ones mostly forked or twice-forked, the primary branches about 0.25 mm. long, the rays 0.25–0.35 mm. long, a few stellate, 3-rayed, or bistellate; sori numerous, borne on most of the segments of the pinnae, the indusia about as broad as the segments, not or scarcely immersed at base, the valves suborbicular, about 1 mm. long and broad, rounded, glabrous externally, long-ciliate, the hairs mostly forked at base, the branches simple, 2-celled and geniculate, or often furcate.

TYPE: Jamaica, *Swartz* (fragment US).

RANGE: Cuba, Hispaniola, and Jamaica.

SPECIMENS EXAMINED:

CUBA: At elevations of 750 to 1,000 meters, in the Trinidad Mountains and Sierra Maestra: Buenos Aires, Las Villas, *Jack* 8057. Arroyo Jiménez, Oriente, *Ekman* 14798. Loma del Gato, Oriente, *Clément* 1398 p.p.; *Hioram & Clément* 6510; *Ekman* 6987.

HAITI: Massif de la Selle, alt. 2,000 meters, *Ekman* H 1490.

DOMINICAN REPUBLIC: Loma la Vieja, Constanza, alt. 2,075 meters, *Ekman* H 14035. Barahona, *Fuertes* 1510 p.p.

JAMAICA: Parishes of St. Thomas, St. Catherine, Portland, and St. Andrew, at low elevations, 300–900 meters: *Maxon* 1543, 1565, 1915, 2247, 2430, 2433, 8845, 8856, 8959, 9061, 9119, 10583; *Maxon & Killip* 177, 773, 777; *Underwood* 1268; *Clute* 123; *Wilson*.

Although this species has been assigned a wide range by various authors, it appears to be restricted to the Greater Antilles.

23. Hymenophyllum maxonii Christ, in sched.

Frondes pendulae, indefinitae, stipitibus apice valde alatis, sparse pilosis, pilis elongatis, simplicibus vel furcatis, pluricellularibus; laminae ovatae vel oblongae, apice acutae, basi non reductae, rhachibus ubique alatis; pinnae imbricatae, adscendentes, subrhombeae, acutae vel obtusae, alte pinnatifidae, pinnulis 4–8-jugis, basalibus pinnatifidis, segmentis ultimis linearibus, non undulatis; pili in rhachibus stellati, stipitati, 3–6-radiati, in venis paucis, plerumque furcati vel stellati, longe stipitati, 3–5-radiati, in marginibus plerumque bis-furcati, vel raro semel furcati, pauci stellati, 3-radiati; indusia basi leviter immersa, segmentis latiora, valvis suborbicularibus, externe glabris, longe ciliatis.

Rhizomes wide-creeping, 0.2–0.3 mm. in diameter, densely red-pilose; fronds pendent, determinate; stipes variable in length, 3–9.5 cm. long, 0.4–0.5 mm. in diameter, conspicuously alate at apex, sparsely pilose, the hairs elongate, simple or bifid, the stalk mostly 3 cells long, the rays 2 cells long; blades ovate to oblong, 6–13 cm. long, 2.5–4.5 cm. broad, acute at apex, not or scarcely reduced at base, the rhachis alate throughout, the wing not undulate; pinnae ascending, imbricate, 9–17 pairs, subrhombic, 1.5–2.5 cm. long, 8–13 mm. broad, adnate, acute or obtuse at apex, somewhat excavate at lower base, deeply pinnatifid, the costa broadly alate; pinnules 4–8 pairs, the basal ones pinnatifid, the superior basal one with the veins mostly twice-forked, the ultimate segments broadly linear, up to 6 mm. long,

1–1.5 mm. broad; hairs lacking on the leaf surfaces, those of the rhachis stellate, stalked, 3–6-rayed, those of the veins scattered, mostly forked or some stellate, long-stalked, 3–5-rayed, the marginal ones mostly twice-forked, the primary branches about 0.25 mm. long, the rays 0.25–0.5 mm. long, or some only once-forked, a few stellate, 3-rayed; sori borne on all or merely the apical segments, the indusia shallowly immersed at base, broader than the segments, the valves suborbicular, rounded, 1.2–1.5 mm. long and broad, glabrous externally, long-ciliate, the hairs forked at base or upwardly.

Type in the U. S. National Herbarium, No. 473307, collected on trail from Senahú to Actalá, Department of Alta Verapaz, Guatemala, on tree trunk in humid forest, January 17, 1905, by William R. Maxon and Robert Hay (No. 3326).

RANGE: Departments of Alta Verapaz and Chiquimula, Guatemala, at middle elevations.

ADDITIONAL SPECIMENS EXAMINED:

GUATEMALA: Type locality, *Maxon & Hay* 3328, 3335. Chicoyonito, *Donnell Smith* 1548. Montaña Tajurań, Chiquimula, *Steyermark* 30787.

23a. Hymenophyllum maxonii var. **angustius** Morton, var. nov.

A var. typica frondibus plerumque longioribus et angustioribus, laminis lanceolatis vel linearibus, pinnis non vel vix imbricatis, simplicioribus differt.

Differs from the typical variety in having the fronds mostly longer (up to 20 cm. long) and relatively narrower, the blades lanceolate to linear, and the pinnae less divided, not or scarcely imbricate.

Type in the U. S. National Herbarium, No. 1081923, collected on road from Chamá to Cobán, Department of Alta Verapaz, Guatemala, at 900 meters elevation, August 1, 1920, by Harry Johnson (No. 532).

RANGE: Department of Alta Verapaz, Guatemala, at elevations of 900 to 1,200 meters.

ADDITIONAL SPECIMENS EXAMINED:

GUATEMALA: Cobán, *Johnson* 918, 923. Río Cobán, *H. Johnson* 705. Quebradas Secas, *H. Johnson* 817. Cerro Sillab, *Hatch & Wilson* 176, 181. Chicoyou, *Hatch & Wilson* 239; Finca Los Alpes, *C. L. Wilson* 339. Pansamalá, *von Tuerckheim* 647 p.p.

Hymenophyllum maxonii is a critical species, intermediate between *H. hirtellum*, *H. hirsutum*, and *H. trapezoidale*, but it can hardly be included in any of them without destroying their homogeneity. The most closely allied is probably *H. hirtellum*, under which name the present species has been passing.

24. Hymenophyllum subrigidum Christ, Bull. Herb. Boiss. II. **5**: 260. 1905.

Hymenophyllum atrovirens Christ, Bull. Herb. Boiss. II. **4**: 941, 1904, not Colla (1844), nor Fée (1866).

Sphaerocionium subrigidum Copel. Phil. Journ. Sci. **67**: 34. 1938.

Rhizomes 0.5 mm. in diameter, densely red-pilose; fronds determinate; stipes 1.5–10 cm. long, 0.3–0.7 (1) mm. in diameter, nonalate throughout, red-pilosulous, the hairs simple or forked, several-celled; blades ovate to ovate-lanceolate, 4.5–23 cm. long, 3–10 cm. broad, the rhachis narrowly alate upwardly, nonalate at base; pinnae often reflexed, 9–14 pairs, ovate-lanceolate, 1.5–6.5 cm. long, 1–2 cm. broad, acuminate at apex, sessile, the lower adnate at upper base, not adnate at lower, deeply pinnatisect; pinnules 6–8 pairs, bipinnatifid, the ultimate segments short, narrow, 0.6–0.7 mm. broad; hairs of the rhachis forked or stellate, 3- or 4-rayed, short-stalked, absent on the veins and costae above, those of the veins and costae beneath simple or forked at base, coarse, the marginal simple or forked at base, mostly reflexed, coarse; sori numerous on the apical pinnae, not at all immersed at base, the valves semicircular, 1 mm. long and broad, rounded at apex, ciliate, the hairs all simple.

TYPE: Costa Rica, *Wercklé* s. n. (isotype US).

RANGE: Costa Rica and Panama, at elevations of 1,500 to 2,250 meters.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: Cerro de las Caricias, *Standley & Valerio* 52270. San Gerónimo, *Wercklé* 585. Las Nubes to La Palma, *Knight* 29373. Cerro de la Carpintera, *Standley* 35659. Santa Clara de Cartago, *Maxon & Harvey* 8202, 8237; *Lankester* 708; *Torres* 204.

PANAMA: Río Piarnasta, Chiriquí, *Killip* 5404 p. p. East of Río Caldera, Chiriquí, alt. 1,650 meters, *Killip* 5495.

25. Hymenophyllum ruizianum (Klotzsch) Kunze, Bot. Zeit. **1847**: 199. 1847.

Sphaerocionium ruizianum Klotzsch, Linnaea **18**: 535. 1844.

Hymenophyllum pastoense Hook. in Hook. & Bak. Syn. Fil. 67. 1867. Type from Pasto, Nariño, Colombia, *Jameson*.

Rhizomes creeping, 0.6–1 mm. in diameter; fronds pendent, determinate; stipes 10 (rarely only 7)–16 cm. long, 0.7–1.6 mm. in diameter, nonalate, densely hairy, the hairs simple or forked, elongate, several-celled; blades ovate-oblong, 19–28 cm. long, 9–17 cm. broad, acuminate, the rhachis alate upwardly, nonalate toward base; pinnae spreading or drooping, 10–13 pairs, ovate-lanceolate, 4.5–8.5 long, 1.5–4 cm. broad, the lower petiolulate, long-acuminate, tripinnatifid, divided at base nearly to costa; pinnules 9–12 pairs, the lower deeply twice-parted, the ultimate segments narrow, 0.5–0.7 mm. broad; hairs of the rhachis stellate, 3- or 4-rayed, short-stalked, those of the veins forked or stellate, 3–5-rayed, short-stalked, a few simple, the marginal ones simple or forked at base, reflexed; sori small, numerous on the apical segments of the pinnae, the valves 0.6–1 mm. long, 1–1.2 mm. broad, broader than the segments, glabrous externally, ciliate, the hairs simple, often 2-celled and geniculate.

TYPE: Peru, *Ruiz* 85.

RANGE: Colombia, Ecuador, Peru, and Bolivia, at elevations of 1,700 to 3,600 meters.

SPECIMENS EXAMINED:

COLOMBIA: Alto de Tabano, Nariño, *André* 2977. Páramo Rico, Santander, *Killip & Smith* 17787 (G, NY, US). Páramo de San Antonio del Bordoncillo, Putumayo, alt. 3,250 meters, *Cuatrecasas* 11700.

ECUADOR: *Spruce* 5421 (NY). Not typical.

PERU: Playapampa, Huánuco, *Macbride* 4516. Department of Cuzco, *Herrera* 2142, 2144; *Bües* 722, 819, 1544, 1576, 1918, 1942; *Vargas* 3295.

BOLIVIA: Kuriloma, Cochabamba, *Steinbach* 9260 (G, NY). Between Soratá and Mapiri, *Cárdenas* 1044 (G).

26. Hymenophyllum trapezoidale Liebm. Dansk. Vid. Selsk. Skrivt. V. **1**: 293. 1849.

Hymenophyllum ciliatum var. *nudipes* Kunze, Linnaea **18**: 351. 1844. Based on a plant collected at Cuesta Grande de Jalacingo, Veracruz, Mexico, by Schiede, and listed by Schlechtendal and Chamisso as "810: *Hymenophyllum* affine *ciliato* Sw."[8] This variety was referred by Fournier to *H. hirsutum*, but that seems impossible from the brief description. The collection is probably the same as that on which *H. apterum* was based.

Hymenophyllum apterum v. d. Bosch, Ned. Kruid. Arch. **5**: 194. 1863. Type from Cuesta Grande de Jalacingo, Veracruz, Mexico, *Schiede*.

Fronds pendent, determinate; stipes 1.5–18 cm. long, (0.3) 0.4–0.6 mm. in diameter, nonalate, sparsely pilose, the hairs simple or forked; blades linear or linear-lanceolate, 12–30 cm. long, 2–6 cm. broad, long-attenuate at apex, the rhachis alate above middle, nonalate below; pinnae ascending, 10–25 pairs, ovate-

[8] Linnaea **5**: 619. 1830.

lanceolate to subrhombic, 1–4 cm. long, 7–18 mm. broad, acuminate at apex, adnate at upper base, the upper adnate and decurrent at lower base, deeply pinnatifid; segments 4–7 pairs, the upper basal deeply pinnatifid, the veins 3 or 4 times dichotomous, the ultimate segments broadly linear, 1–1.5 mm. broad; hairs of the rhachis stellate, 3- or 4-rayed, stalked, those of the veins stellate, 3- or 4-rayed, or forked, a few simple or basally forked, the marginal ones variable, mostly forked or stellate, 3-rayed, or some twice-forked, or sometimes almost all simple or basally forked; indusia rather deeply immersed at base, the valves 1–1.4 mm. long, not broader than the segments, glabrous externally, long-ciliate, the hairs simple, often 2-celled and geniculate.

TYPE: Chinantla, Mexico, *Liebmann.*

RANGE: Mexico, Surinam, and Colombia.

SPECIMENS EXAMINED:

MEXICO: Jalapa, Veracruz, alt. 1,200 meters, *Pringle* 8157; *Johnson.* Mirador, Veracruz, alt. 1,000 meters, *Purpus* 164, 165, 166. Zacuapan, Veracruz, *Purpus* 1985. Sierra de Ocuila, Morelos, *Lyonnet* 2858. Mesón Viejo, Temascaltepec, Mexico, alt. 2,830 meters, *Hinton* 3268. Santa María, Choapam, Oaxaca, alt. 1,500 meters, *Mexia* 9277 p. p. Cerro de Cuhuatepetl, Puebla, alt. 3,800 meters, *Santos* 3351.

COLOMBIA: *Mutis* 3186, 3193. Páramo Rico, Santander, *Killip & Smith* 17220 (NY, US), 17839 (G, NY, US). Quebrada de Pais, Santander, *Killip & Smith* 18773 p. p. (NY). Cruz Verde, Cundinamarca, *Apollinaire & Arthur* 10. Usaquén, Cundinamarda, *Guevara A.* A34. Boquerón de San Francisco, near Bogotá, Cundinamarca, *Lehmann* 2442. Santa Elena, Medellín, Antioquia, *Henri-Stanislas* 1688c.

SURINAM: 2 km. south of East Ridge, Tafelberg, *Maguire* 24579.

The present species is close to *H. hirsutum*, but is a larger plant with stipe and lower part of rhachis essentially nonalate and with simpler marginal hairs. It is one of the few species showing a strikingly disjunct distribution.

27. Hymenophyllum latifrons v. d. Bosch, Ned. Kruid. Arch. **4**: 407. 1859.

Rhizomes long-creeping, 0.2 mm. in diameter; fronds pendent; stipes filiform, 0.5–1.5 cm. long, 0.2 mm. in diameter, alate at apex, deciduously hirsute, the hairs mostly simple, elongate, 2- or 3-celled, a few forked, the branches elongate, 1- or 2-celled; blades ovate to linear, 3.5–17 cm. long, 1.5–3 cm. broad, rounded or acutish at apex, the rhachis broadly alate throughout, the wing mostly 1.5 mm. broad on either side; pinnae ascending, 7–20 pairs, either all simple and linear, 2.5–3 mm. broad, or the lower bifid or sometimes shallowly pinnatifid, with two upper lobes and 1 lower; hairs of leaf surfaces and veins scattered, all stellate, long-stalked, 3–6-rayed, those of the margins stellate, 4–6-rayed, or bistellate, long-stalked, the stalk 0.5–0.7 mm. long; indusia narrower than the segments, scarcely immersed at base, the valves roundish, about 1.2 mm. long, 1.5 mm. broad, glabrous on the surfaces, ciliate, the hairs partly simple, mostly stellate, long-stalked.

TYPE: Guadeloupe, *Perrottet.*

RANGE: Guadeloupe, Martinique, St. Vincent, and Dominica, in rain-forests at elevations from 600 to 1,400 meters.

SPECIMENS EXAMINED:

GUADELOUPE: Grande Découverte, *Duss* 4265.

DOMINICA: Morne Trois Pitons, at summit, *Hodge* 1412.

MARTINIQUE: Montagne Pelée, *Duss* 1519 (fide Hodge).

ST. VINCENT: Jenman Herb. (fide Hodge).

Dr. W. H. Hodge in his study of Dominica ferns gave a discussion and fine illustration of this species (Amer. Fern Journ. **31**: 125–126. *pl. 2.* 1941).

28. Hymenophyllum antillense (Jenm.) Jenm. Bull. Bot. Dept. Jamaica **18**: 6. 1890.

Hymenophyllum lineare var. *antillense* Jenm. Journ. Bot. **17**: 258. 1879.

Sphaerocionium antillense Copel. Phil. Journ. Sci. **67**: 32. 1938.

Rhizomes creeping, filiform; fronds pendent, indeterminate; stipes 3–4 cm. long, filiform, about 0.1 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mostly simple, elongate, 2- or 3-celled, a few forked, the branches elongate, 1- or 2-celled; blades linear, 11–24 cm. long, 12–22 mm. broad the rhachis straight, nonalate below, narrowly alate upwardly; pinnae 8–27 pairs, the lower distant, petiolulate, the middle sessile, the upper adnate, subcuneate in outline, 8–20 mm. long, 4–8 mm. broad, deeply pinnatifid, the segments mostly 1 or 2 pairs (or some pinnae merely bifid), linear, all 1-nerved, about 1 mm. broad; hairs few on leaf surfaces, abundant on veins and margins, all stellate (or some of the marginal bistellate), stalked, 3–6-rayed, the rays about 0.25 mm. long; sori narrower than the segments, the indusia deeply immersed, 0.6–0.7 mm. long and broad, rounded, entire, long-ciliate, the hairs stellate, stalked.

TYPE: Jamaica, *Jenman* 85 (fragment and photograph US).

RANGE: Jamaica and British Guiana.

ADDITIONAL SPECIMEN EXAMINED:

BRITISH GUIANA: Upper slopes of Mount Roraima, *im Thurn* 200.

No material quite matching the type has been seen, although the British Guiana specimen cited above agrees fairly well. The species is a critical one and much more material is needed to determine its real status.

29. Hymenophyllum hemipteron Rosenst. Repert. Sp. Nov. Fedde **22**: 4. 1925.

Hymenophyllum hemipteron f. *acropteron* Rosenst. loc. cit. Type from La Palma, Costa Rica, *A. & C. Brade* 851 (fragment US).

Hymenophyllum hemipteron f. *minor* Rosenst. loc. cit. Type from San Gerónimo, Costa Rica, *A. & C. Brade* 620 (fragment US). An atypical, depauperate form.

Sphaerocionium hemipteron Copel. Phil. Journ. Sci. **67**: 31. 1938.

Rhizomes creeping, about 0.15 mm. in diameter; fronds pendent, determinate; stipes 0.5–5 cm. long, filiform, about 0.2 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mostly simple, elongate, 2- or 3-celled, a few forked, the branches elongate, 2- or 3-celled; blades ovate to lanceolate, 1.5–9 cm. long, 1.3–2 cm. broad, the rhachis nonalate at base or nearly throughout, not flexuous; pinnae 5–14 pairs, the lower petiolulate, deeply pinnatifid; segments 3–5 pairs, the lower simple or mostly bifid (rarely some of them trifid), the ultimate lobes 1 mm. broad or less; hairs of leaf surfaces, veins, and margins abundant, all stellate (or some of the marginal bistellate), stalked, 3–5-rayed; sori minute, narrower than the segments, the indusia slightly immersed at base, the valves about 0.5 mm. long and 0.6 mm. broad, stellate-pilose externally, long-ciliate, the hairs stellate, stalked.

TYPE: Tablazo, Costa Rica, *A. & C. Brade* 621 (fragment US).

RANGE: Costa Rica and Panama.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: La Palma, alt. 1,500 meters, *Jiménez* 593; *Knight; Brade* 852; *Standley* 33044. Vara Blanca, alt. 1,600–1,700 meters, *Maxon & Harvey* 8358. Santa Clara de Cartago, alt. 1,950 meters, *Maxon & Harvey* 8172, 8187, 8193, 8236, 8239; *Lankester* 664.

PANAMA: Region of Volcán Chiriquí, alt. 1,650–1,800 meters, *Killip* 5264, 5270, 5280; *Cornman* 1204.

30. Hymenophyllum elegantulum v. d. Bosch, Ned. Kruid. Arch. **4**: 408. 1859.

Hymenophyllum pulchellum sensu Hook. Sp. Fil. **1**: 91. 1846, p. p., not Schlecht. & Cham., and op. cit. *pl. 33A*. 1846.

Hymenophyllum buchtienii Rosenst. Repert. Sp. Nov. Fedde **5**: 229. 1908. Type from Unduavi, North Yungas, Bolivia, *Buchtien* 897 (isotype US).

Sphaerocionium elegantulum Copel. Phil. Journ. Sci. **67**: 32. 1938.

Sphaerocionium buchtienii Copel. op. cit. 31.

Rhizomes creeping, filiform, 0.15–0.2 mm. in diameter; fronds pendent, indeterminate; stipes 2–6 cm. long, filiform, about 0.25 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mostly simple, 2- or 3-celled, a few forked, the branches elongate, 2- or 3-celled; blades extremely variable, typically linear, 10–30 cm. long, 2–4 cm. broad, the rhachis filiform, nonalate throughout or sometimes alate upwardly, sparingly pilosulous; pinnae 10–30 pairs, subsessile, sessile, or slightly adnate at base, normally rhombic-ovate, 1–2 cm. long, 8–13 mm. broad at base, obtuse or acutish at apex, deeply pinnatifid with 4–6 pairs of lobes, the basal superior lobes with twice-dichotomous veins, the upper ones with simple veins, the ultimate segments 1–1.5 mm. broad, or some of the pinnae elongate and frondlike, up to 17 cm. long, fully pinnate-pinnatifid, the rhachises nonalate, the pinnules up to 11 pairs, these similar to normal pinnae; hairs of leaf surfaces, veins, and margins all stellate (or the marginal sometimes bistellate), stalked, 4–7-rayed; veins not winged on either side of the frond; indusia not or only slightly immersed, the valves broader than long, 1–1.5 mm. broad, stellate-pubescent externally, ciliate, the hairs rather long-stalked.

TYPE: Based on Hooker's plate 33A (Sp. Fil., vol. 1). No description was given by van den Bosch, but the species is validly published by the reference to a plate with analyses. Hooker's plate was based on a specimen collected by Jameson at Pillzhum, Ecuador (isotype NY).

RANGE: Cuba, Hispaniola, Mexico, Guatemala, Costa Rica, Panama, and Colombia to Bolivia.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Crest of Sierra Maestra, between Pico Turquino and La Bayamesa, alt. 1,350 meters, *Morton & Acuña* 3558.

DOMINICAN REPUBLIC: Valle Nuevo, Cordillera Central, alt. 2,400 meters, *Ekman* H 13834a, H 13834b. Sierra de Ocoa, alt. 2,300 meters, *Ekman* H 12004.

MEXICO: At elevations of 1,500 to 2,800 meters: Teotepec, Guerrero, *Hinton* 14306. Cuicatlan, Oaxaca, *Conzatti & Gonzalez* 720; *Conzatti & Gomez* 3477. Volcán Tacana, Chiapas, *Matuda* 2908.

GUATEMALA: Santa Elena, Chimaltenango, alt. 2,400–2,700 meters, *Skutch* 286. Todos Santos, alt. 3,000 meters, *Nelson* 3633.

COSTA RICA: Turrialba, alt. 2,600 meters, *Pittier* (Donn. Sm. 7490; Herb. Nac. Cost. 12359).

PANAMA: Region of Volcán Chiriquí, at elevations from 1,650 to 2,268 meters: *Maxon* 5457, 5468, 5491, 5632.

COLOMBIA: Departments of Antioquia, Caldas, Cundinamarca, Santander, and Tolima, at elevations from 2,800 to 3,800 meters: *Ariste Joseph; Mutis* 3189, 3197, 3198, 3209; *Apollinaire & Arthur* 141; *Wallis; André* 1295 (G, NY, US), 2201 (NY); *Mayor* 73; *Killip & Hazen* 9458 (NY, US); *Pennell & Hazen* 10081 (NY, US).

ECUADOR: Papallacta, alt. 3,200 meters, *Mille* p. p. (NY). Oyacachi, *Sodiro* p. p. (NY). Pichincha, alt. 3,000 and 3,400 meters, *Mille; Heilborn* 700.

PERU: Michihuañuncca, Cuzco, alt. 3,000 meters, *Bües* 720.

BOLIVIA: Unduavi, *Buchtien* 104 (G, NY), 2745 (G, US).

The West Indian specimens referred here are depauperate and atypical. Typical material of *H. elegantulum* can be distinguished from *H. antillense* and *H. hemipteron* by having the lower pinnae sessile. However, the following variety connects these species in this character.

30a. Hymenophyllum elegantulum var. **petiolulatum** Morton, var. nov.

A var. typica pinnis infimis petiolulatis differt.

Differs from the typical variety in having the lowest pinnae petiolulate.

Type in the U. S. National Herbarium, No. 1784437, collected at Jayuya, Puerto Rico, at an elevation of 1,200 meters, September 19, 1943, by F. H. Sargent (No. 3144).

RANGE: Puerto Rico and Costa Rica, and perhaps elsewhere.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: Volcán Barba, alt. 2,600 meters, *M. Valerio* 95. Volcán Turrialba, alt. 3,100 meters, *Torres* 6. Las Nubes, alt. 1,500–1,900 meters, *Standley* 38811.

31. Hymenophyllum simplex Morton, sp. nov.

Rhizoma repens, filiforme; frondes procumbentes, stipitibus elongatis, filiformibus, nonalatis, pubescentibus, pilis stellatis, stipitatis, 3–6-radiatis; laminae parvae, ambitu ovatae, rhachibus supra medium alatis, basi nonalatis; pinnae lineares, simplices, angustae, uninerviae; pili in superficiebus, venis, et marginibus omnes stellati, breviter stipitati, 5–7-radiati, radiis brevibus; indusia segmentis angustiora, basi subimmersa, valvis suborbicularibus, ciliatis.

Rhizomes creeping, filiform, about 0.15 mm. in diameter; fronds prostrate, determinate; stipes 3–4 cm. long, filiform, about 0.15 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs stellate, stalked, 3–6-rayed, the rays 1 cell long; blades ovate in outline, 2–3 cm. long, 7–13 mm. broad, the rhachis narrowly alate above the middle, the wing about 0.3 mm. broad on either side, nonalate at base; pinnae ascending, all simple, linear, 8–12 mm. long, about 1 mm. broad, not undulate, 1-veined; hairs of leaf surfaces, veins, and margins all stellate, very short-stalked, 5–7-rayed, the rays about 0.25 mm. long, 1-celled; indusia narrower than the segments, slightly immersed at base, the valves suborbicular, about 0.7 mm. long, ciliate, the hairs all stellate.

Type in the U. S. National Herbarium, No. 1629676, collected at Tambillo, Department of Huánuco, Peru, July 8, 1878, by C. de Jelski (No. 897).

The type specimen was determined by Dr. Christ as *H. hirsutum* (L.) Swartz [i. e., *H. fragile*], with which it has no near affinity. In its simple, linear pinnae and in pubescence it suggests *H. lanatum* Fée, but in that species the rhachis is alate throughout and the stipe alate at apex.

32. Hymenophyllum lanatum Fée, Mém. Foug. **11**: 116. *pl. 31, f. 3.* 1866.

Sphaerocionium lanatum Copel. Phil. Journ. Sci. **67**: 31. 1938.

Rhizome filiform, 0.2 mm. in diameter; fronds pendent, determinate; stipes filiform, 1–3 cm. long, 0.2 mm. in diameter, very inconspicuously alate at very apex, deciduously pubescent, the hairs stellate, stalked, 3- or 4-rayed; blades ovate to oblong-linear, 2–6 cm. long, 1–1.8 cm. broad, the rhachis narrowly alate throughout, the wing not over 0.7 mm. broad on either side; pinnae 7–20 pairs, ascending, almost all simple and linear (a few bifid at apex or rarely pinnatifid, with 2 pairs of segments), 8–11 mm. long, 1.5–1.7 mm. broad; hairs of leaf surfaces and veins abundant, stellate, obviously stalked, mostly 5- or 6-rayed, the marginal bistellate, short-stalked (0.25–0.3 mm.), mostly 3- or 4-rayed; sori not numerous, apical, the indusia cuneate and immersed at base, the valves about 1 mm. long and broad, rounded, stellate-pilose externally, ciliate, the hairs mostly stellate, long-stalked.

TYPE: Sainte-Rose, Guadeloupe, *L'Herminier* in 1861.

RANGE: Cuba, Hispaniola, Jamaica, Guadeloupe, Puerto Rico, Grenada, St. Vincent, Guatemala, and Venezuela.

SPECIMENS EXAMINED:

CUBA: Mountains, at elevations of 650 to 1,000 meters: *Wright* 905. Loma del Gato, *Hioram & Clément* 6517; *León, Clément, & Roca* 10258; *Clément* 2183. Sierra Moa, *Shafer* 8130. Sierra de Buena Vista, *Ekman* 3883.

DOMINICAN REPUBLIC: San Francisco de Macorís, alt. 900 meters, *Abbott* 2076.

JAMAICA: Blue Mountains, at elevations of 600 to 1,900 meters: *Maxon* 955, 959, 1075, 1297, 1732, 2714, 8943, 9017, 9021, 9027a, 9123, 9197, 9283, 9422, 9589, 9654, 9717, 9742, 10028, 10139, 10201, 10252; *Maxon & Killip* 670, 705, 1172; *Watt* 188bis; *E. G. Britton* 1129; *Johnson; Hart* 129; *Clute* 84.

PUERTO RICO: *Schwanecke* (Berlin), fide Maxon (Proc. Biol. Soc. Washington **46**: 144. 1933).

GUADELOUPE: *L'Herminier.* Bains-Jaunes, *Questel* 1790; *Trelease* 21. Cone de la Soufrière, *Duss* 4267a.

GRENADA: *Sherring.* Above Grand Etang, *Miller.*

ST. VINCENT: *Eggers* 6903.

GUATEMALA: Alta Verapaz, at elevations of 1,000 to 1,350 meters: *Cook & Doyle* 150; *Maxon & Hay* 3334; *von Tuerckheim* II. 1938; *Hatch & Wilson* 100, 178.

VENEZUELA: Colonia Tovar, *Fendler* 387 (G).

33. Hymenophyllum fragile (Hedw.) Morton, comb. nov.

Trichomanes fragile Hedw. Fil. Gen. *pl.* [*18*]. 1802.

Trichomanes rigidum bis Hedw. op. cit. in text, not Swartz, 1788.

Trichomanes hirsutum sensu Hedw. op. cit. *pl.* [*10*], not L., 1753.

Trichomanes hispidum Poir. in Lam. Encycl. **8**: 71. 1808. New name for *T. rigidum* Hedw., not Swartz.

Hymenophyllum intercalatum Christ, Bull. Herb. Boiss. II. 4: 942. 1904. Type from Turrialba, Costa Rica, *Pittier* (Herb. Nat. Cost. 13259 *ter*).

Rhizomes filiform, 0.2 mm. in diameter; fronds pendent, more or less determinate; stipes filiform, 0.5–2.5 cm. long, 0.25 mm. in diameter, alate at apex (sometimes very shortly), deciduously pubescent, the hairs partly forked, partly stellate; blades ovate to linear-lanceolate or linear, 3–15 cm. long, 1.2–2.5 cm. broad, the rhachis broadly alate throughout, the wing 0.5–1 mm. broad on either side; pinnae ascending, 4–20 pairs, subflabellate, 5–15 mm. long, 4–12 mm. broad, pinnatifid, the costa broadly winged, the lobes usually 1 on the lower side and 2 on the upper side, sometimes the lowest with 2 lower lobes and 3 upper, the segments plane, broad, 1.5–2 mm. broad, all simple and 1-veined, or rarely the superior basal one bifid; hairs of the leaf surfaces and veins abundant, all stellate, short-stalked, mostly 5- or 6-rayed, those of the margins bistellate, the stalks very short (about 0.1 mm. long), the rays mostly 5 or 6; sori on the apical pinnae, the indusia narrower than the segments, the valves broader than long, about 1 mm. broad, rounded, densely stellate-pilose, ciliate, the hairs stellate.

TYPE: "America meridionalis."

RANGE: Cuba, Haiti, Jamaica, and Mexico to Bolivia and Brazil.

SPECIMENS EXAMINED:

CUBA: Summit of Punta de Palma Mocha, Sierra Maestra, alt. 1,400 meters, *Ekman* 5209.

HAITI: Massif de la Selle, alt. 2,200 meters, *Ekman* H 7721.

JAMAICA: Common in deep forest in the Blue Mountains, at elevations of 1,350 to 1,900 meters: *Swartz; Maxon* 1220, 1256, 9732, 9749, 10140, 10189, 10250, 10259; *Webster & Goldberg* 138; *Harris* 7113; *Chrysler* 1660; *Hart* 217; *Johnson;* J. P. 65; *Watt* 36.

MEXICO: Orizaba, Veracruz, *Pringle* 6079. Trinidad Iron Works, Hidalgo, *Pringle* 13255.

GUATEMALA: Department of Alta Verapaz, at elevations of 750 to 1,040 meters: *von Tuerckheim* 951; *Johnson* 813; *Hatch & Wilson* 216; *Maxon & Hay* 3327; *Cook & Griggs* 400. These represent a depauperate form with mostly undivided pinnae.

COSTA RICA: Common at elevations of 1,400 to 1,800 meters: *Wercklé; Maxon* 508, 519; *Maxon & Harvey* 8178; *Lankester* 752; *Standley* 34418, 35535, 35667; *Standley & Torres* 51062, 51360; *M. Valerio* A11, 151, 2349; *Torres* 117, 192; *Skutch* 3559; *Stork* 1176; *Brade.*

PANAMA: Common in the region of Volcán Chiriquí, at elevations of 1,500 to 1,900 meters: *Maxon* 5610, 5683; *Killip* 5226, 5282, 5283, 5395, 5399a; *Cornman* 1303.

VENEZUELA: Colonia Tovar, *Moritz 266* (NY, US); *Fendler* 38 (G, NY, US).

COLOMBIA: At elevations of 1,500 to 2,350 meters: Micay Valley, El Cauca, *Killip* 7736 (NY, US). San Antonio, El Valle, *Killip & Garcia* 33934. Farallones de Cali, El Cauca, *Lehmann* 1983. La Sierra, north of Medellín, Antioquia, *Archer* 1659. La Cumbre, El Valle, *Killip* 11294 (NY, US). Horqueta Mountain, Santa Marta Mountains, Magdalena, *H. H. Smith* 2600 (NY, US).

PERU: Alturas de Pintobamba, Cuzco, alt. 2,700 meters, *Vargas* 3262.

BOLIVIA: Polo-Polo, North Yungas, alt. 1,100 meters, *Buchtien* 3575; a depauperate form. Cargadera, *Williams* 1235 (NY, US).

BRAZIL: States of Rio de Janeiro, Santa Catherina, and Rio Grande do Sul): *Juergens* 136 (Rosenst. exs. 156) (NY, US); *Brade* 9573 (NY); *Brade* (Mus. Nac. Rio Jan. 21612) (NY); *Spannagel* 156; *Glaziou* 6410 (NY); *Riedel; Webb* (NY).

33a. Hymenophyllum fragile var. **venustum** (Desv.) Morton, comb. nov.

Hymenophyllum hirsutum sensu Raddi, Syn. Fil. Bras. 19. 1819; Pl. Bras. 66. *pl. 79, f. 3.* 1825, not Swartz, 1801.

Hymenophyllum venustum Desv. Mém Soc. Linn. Paris **6**: 332. 1827. New name for *H. hirsutum* sensu Raddi, not Swartz, 1801.

Hymenophyllum raddianum C. Müll. Bot. Zeit. **1854**: 723. 1854 (*nom. abort.*). New name for *H. hirsutum* sensu Raddi, not Swartz, 1801.

Sphaerocionium raddianum Copel. Phil. Journ. Sci. **67**: 31. 1938 (*nom. abort.*).

Differs from the typical variety in having the pinnae mostly simple or merely bifid.

TYPE: Mandiocca, Brazil, *Raddi.*

RANGE: Southern Brazil.

SPECIMENS EXAMINED:

BRAZIL: Theresapolis, Rio de Janeiro, *Brade* 9549 (NY); Jaraguá, São Paulo, *Brade* 5207 (NY). Rio Grande, São Paulo, *Brade* 8325. Joinville, Santa Catherina, *Schmalz* (NY). Organ Mountains, *Miers* 250. Near Rio de Janeiro, *Webb* (NY).

The present species has been known universally as *Hymenophyllum hirsutum* (L.) Swartz, based on *Trichomanes hirsutum* L. (Sp. Pl. 1098. 1753). There is no specimen of this species in the Linnaean Herbarium, and so the application of the name will depend on the original description, the synonyms cited, and the subsequent treatment of the species by Linnaeus. The original description and references are as follows:

Trichomanes frondibus pinnatis: pinnis alternis pinnatifidis pilosis.
Filicula digitata Plum. spec. 13 [error for 73]. fil. t. 50. t. B.
Darea americana major pubescens. Pet. mus. 762.
Dareae affinis digitata. Pet. fil. 105. t. 15. f. 5.
Habitat in America.

It is obvious that the description is applicable to most species of the section *Sphaerocionium*. It is taken wholly from Plumier, as are also the descriptions and figure of Petiver. However, Plumier's figure, although crudely drawn as usual, is obviously the plant described by Swartz as *Trichomanes ciliatum* [i. e., *Hymenophyllum ciliatum* Swartz]. The four to seven pairs of segments of the pinnae and the strongly winged stipe agree with that species, as does also Plumier's description of the blade as 2 inches broad. The present species, usually known as *H. hirsutum*, has only 1 or 2 pairs of segments (rarely 3), an inconspicuouly winged stipe, and a blade never more than 1 inch broad. Also, Plumier's description of the pinnae as "fimbriate" agrees better with *H. ciliatum*, in which the marginal hairs are conspicuous. The marginal hairs are minute and inconspicuous in the present species.

It therefore appears that the original Linnaean concept was drawn wholly from Plumier and applied to the plant usually known as *H. ciliatum*. The same diagnosis and synonymy are repeated in all the editions of the Species Plantarum and Systema Vegetabilium that appeared during the lifetime of Linnaeus. There are no changes or emendations through Gmelin's edition of the Systema of 1794.

The first appearance of the use of the name *hirsutum* in its recent sense is in Hedwig's Filicum Genera et Species (1799–1803). Swartz, in his treatment in his Prodromus, ignored *Trichomanes hirsutum*. That Hedwig was somewhat confused is probably due to Swartz's description of *T. ciliatum*, for he illustrates that species and also gives two illustrations of the present species, once as *T. hirsutum*, and once as a new species, which it really was. Unfortunately, the name he chose for the plant described as new was *T. rigidum*, an epithet that had been previously used by Swartz for an entirely different species (a true *Trichomanes* in the modern sense), which, as a matter of fact, was also illustrated by Hedwig in his second plate. Hedwig apparently discovered that his name was a homonym, for although the name appears as *T. rigidum* in the text, on the plate it has been changed to *T. fragile*. Under the Rules, the name *T. fragile* may be considered validly published by the plate alone, for a characteristic habit drawing is given together with magnified details.

I am reluctant to propose such a confusing change in nomenclature as the replacement of the well-known name *H. ciliatum* by *H. hirsutum*, but it seems unavoidable. *Trichomanes hirsutum* cannot be considered a *nomen confusum*, for it was based on a single entity by Linnaeus and was confused only by subsequent authors.

All the names that have been applied to the present species are inappropriate. The plant is not hirsute, but rather minutely stellate-pilose, and the texture is delicate and elastic, rather than rigid or fragile. Poiret's name *hispidum* is especially inappropriate. It was evidently due to a misinterpretation of Hedwig's plate.

34. Hymenophyllum angustum v. d. Bosch, Ned. Kruid. Arch. **5**[1]: 183. 1863.

Rhizomes long-creeping, filiform, 0.2 mm. in diameter; fronds pendent, indeterminate; stipes 0.5–2 cm. long, filiform, 0.25 mm. in diameter, alate toward apex only or nearly to base, deciduously pubescent, the hairs partly forked, partly stellate; blades linear, 5–21 cm. long, 8–11 mm. broad, acuminate at apex, the rhachis alate throughout, the wing 0.5–0.6 mm. broad on either side; pinnae ascending, 15–40 pairs, subrhombic, 4–10 mm. long, 1.5–5 mm. broad at base, obtuse at apex, the lower side entire or subentire, the upper pinnatifid, with 1–3 segments, the basal one simple or bifid, the others simple, the ultimate segments 0.7–1 mm. broad; hairs of leaf surfaces and veins rather numerous, all stellate, rather short-stalked, the marginal mostly bistellate, the stalks 0.25 mm. long or less, the apical rays mostly 3; sori small, borne on most of the apical pinnae,

slightly immersed at base, the valves suborbicular, rounded, 0.6–0.7 mm. long and broad, sparingly stellate-pilose on the surfaces, ciliate, the hairs mostly stellate, long-stalked.

TYPE: San Gabriel de Cachoeiras, on Rio Negro, Amazonas, Brazil, *Spruce* (G, US).

RANGE: Known only from the type collection.

35. Hymenophyllum amabile Morton, Journ. Washington Acad. Sci. **22**: 63. 1932.

Rhizomes long-creeping, 0.5 mm. in diameter; fronds pendent, indeterminate; stipes 2.5–12 cm. long, 0.5 mm. in diameter, terete, not at all alate, pubescent, the hairs all stellate, stalked, elongate, the stalk and rays mostly more than 1 cell long; blades linear, 10–35 cm. long, 2–4 cm. broad, the rhachis straight, terete, not alate; pinnae 20–40 pairs or more, ovate to oblong, up to 2.5 cm. long and 1.5 cm. broad, all sessile, a little decurrent, not at all surcurrent, pinnatipartite; segments 4–8 pairs, all simple and linear, or the lower ones usually bifid or trifid, the ultimate segments oblong, up to 4 mm. long, 1 mm. broad; veins not winged; hairs of the rhachis mostly twice-stellate, the rays often more than 1 cell long, those of the leaf surfaces and veins very numerous and dense, stellate (or some of them twice-stellate), long-stalked, the rays mostly 6 or more, often more than 1 cell long, the marginal ones mostly bistellate; sori apical, not immersed at base, the valves broader than long, about 0.6 mm. long, 1 mm. broad, densely stellate-pilose on the surfaces, long-ciliate, the hairs stellate, stalked.

TYPE: Michihuañuncca, Huadquiña, Cuzco, Peru, *Bües* 715 (US).

RANGE: Ecuador and Peru, at elevations of 2,000 to 4,000 meters.

ADDITIONAL SPECIMENS EXAMINED:

ECUADOR: *Jameson* in 1845 (G); *Mille* s. n. (G). Papallacta, *Mille* (NY, US).

PERU: Department of La Convención, Cuzco, *Bües* 2108, 2109, 2110, 2148, 2150, 2168, 2170. Tambo de Vaca, Huánuco, *Bryan* 628.

36. Hymenophyllum speciosum v. d. Bosch, Ned. Kruid. Arch. **5**: 181. 1863.
Hymenophyllum spectabile Mett. ex Kuhn, Linnaea **35**: 392. 1868. Type from Yungas, Bolivia, *D'Orbigny* 175.
Sphaerocionium spectabile Copel. Phil. Journ. Sci. **67**: 31. 1938.

Fronds pendent, indeterminate in growth; stipes up to 14 cm. long, about 0.5 mm. in diameter, terete throughout, deciduously pubescent, the hairs forked or stellate, a few simple, elongate, 3-celled; blades elongate-linear, up to 1.65 m. long (but sometimes only 25 cm.), normally 6–8 cm. broad, the rhachis nonalate throughout, flexuous, densely tomentose; pinnae 12 pairs or more (usually many), lanceolate to linear-lanceolate, 4–8.5 cm. long, 8–13 mm. broad at base, long-acuminate, cuneate at base, deeply pinnatifid, the basal superior lobes usually with the veins three times dichotomous, the ultimate segments narrowly linear, scarcely more than 0.5 mm. broad; hairs of rhachis numerous, appressed, all stellate, short-stalked, 5- or 6-rayed, those of the leaf surfaces and veins similar, the marginal stellate or bistellate, subsessile; veins not alate on either side of the frond; indusia slightly immersed at base, about 0.75 mm. long, the valves densely tomentose externally, ciliate.

TYPE: St. Gavan, Peru, *Lechler* 2246. An unnumbered specimen collected by Lechler at St. Gavan is in the New York Botanical Garden. It is doubtless an isotype.

RANGE: Peru and Bolivia, at elevations of 2,000 to 3,350 meters.

SPECIMENS EXAMINED:

PERU: Sandillani, *Pearce* s. n. (G, US). Department of Cuzco, *Bües* 576, 1341, 1343, 1535, 1808, 1817, 1821, 1933, 2068, 2136, 2143, 2178.

BOLIVIA: Pelichuco, *Williams* 2605 (NY, US). Cargadira, *Williams* 1233 (G, NY, US). Unduavi, *Buchtien* 2746. Camerapa, *Herzog* 1906.

The present species is the largest of Hymenophyllaceae, the fronds reaching a length of over 1.5 meters, It must be a beautiful plant growing.

37. Hymenophyllum karstenianum Sturm, Bot. Zeit. 17: 298. 1859.

Fronds pendent, indeterminate; stipes 1–4 cm. long, 0.4–0.5 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mixed (simple, forked, and stellate, the rays 2- or 3-celled); blades linear, 13–50 cm. long, 2.5–5 cm. broad, the rhachis nonalate throughout; pinnae 16 pairs or more, linear-lanceolate or lanceolate, 2–3.5 cm. long, 6–9 mm. broad at base, acuminate at apex, cuneate at base, not petiolulate, not adnate or decurrent, deeply pinnatifid; basal superior segments with twice-forked veins, the ultimate segments narrow, about 0.5 mm. broad; hairs of rhachis partly stellate, short-stalked, 5- or 6-rayed, partly long-stalked (the stalk and rays of more than 1 cell) or twice-stellate, those of the leaf surfaces and veins all stellate, numerous, short-stalked, 5- or 6-rayed, the marginal stellate or bistellate, subsessile; veins not alate on either side of the frond; indusia not immersed at base, the valves orbicular, less than 1 mm. long, densely hirsute.

TYPE: Mérida, Venezuela, *Moritz* 381 p. p.

RANGE: Venezuela, Colombia, and Peru, at elevations of 1,300 to 2,000 meters.

SPECIMENS EXAMINED:

VENEZUELA: Colonia Tovar, Aragua, *Fendler* 39 p. p. (G, US). Cano Negro, summit of Mount Duida, *Tate* 852 (NY, US). Without locality, *Moritz* (G).

COLOMBIA: Sierra del Líbano, Santa Marta Mountains, Magdalena, *H. H. Smith* 993 (NY). Mesa de los Santos, Santander, *Killip & Smith* 15358 (G, NY), US). Near Viges, El Cauca, *André* 2684 (NY).

PERU: Tarapoto, *Spruce* 4694 (G, NY, US). Cerro Hatún, Cuzco, *Bües* 803.

This species has commonly passed as the West Indian *Hymenophyllum sericeum*, which differs in its decurrent pinnae and winged veins.

38. Hymenophyllum rufum Fée, Crypt. Vasc. Brés. 1: 198. *pl. 70, f. 4.* 1869.

Hymenophyllum rufum f. *pseudocarpum* Rosenst. Hedwigia **56**: 360. 1915.

Type from Alto da Serra, São Paulo, Brazil, *Brade* 5853.

Sphaerocionium rufum Copel. Phil. Journ. Sci. **67**: 31. 1938.

Rhizomes 0.4–0.5 mm. in diameter, densely rufous-pilose; fronds pendent, indeterminate; stipes 1–7 cm. long, 0.3–0.6 mm. in diameter, nonalate throughout, pubescent, the hairs mixed (simple and several cells long, forked, stellate and long-stalked, or twice-stellate); blades lanceolate to linear, 6–22 cm. long, 2.5–6 cm. broad, rounded or acutish at apex, the rhachis nonalate to middle, narrowly alate upwardly, not or scarcely flexuous; pinnae ascending, 10–20 pairs, lanceolate (or some elongate and frondlike), 2–4 cm. long, 0.6–1.5 cm. broad at base, obtuse, petiolulate or sessile, the upper adnate, deeply pinnatifid, the costa narrowly winged; primary pinnules 6–8 pairs, the lower pinnatifid with 3 or 4 pairs of segments (these simple or bifid), the ultimate segments narrow, 0.7–1.2 mm. broad; veins not winged; hairs of rhachis numerous, reddish, all stellate, 4–6-rayed, the rays sometimes 2-celled, those of the leaf surfaces mostly sessile, those of the veins and margins partly sessile, partly short-stalked, 4–6-rayed; sori small, apical on the pinnae, the indusia narrower than the segments, slightly immersed at base, the valves broader than long, 0.4–0.6 mm. long, 0.6–0.8 mm. broad, rounded, stellate-pilose externally, long-ciliate, the hairs stellate.

TYPE: Southern Brazil, *Glaziou* 2467.

RANGE: Southern Brazil.

SPECIMENS EXAMINED:

BRAZIL: Serra do Itatiaya, *Dusén* 164 (Mus. Nac. Rio Jan. 194) (NY);

L. B. Smith 1760 (G, US); *Rose & Russell* 20580 (NY, US). Pedro Assú, Rio de Janeiro, *Brade* 9510 (NY). Organ Mountains, *Luetzelburg* 395.

39. Hymenophyllum lindenii Hook. Sp. Fil. **1**: 94. *pl. 34c.* 1844.

?*Hymenophyllum terminale* v. d. Bosch, Ned. Kruid. Arch. **5**[3]: 186. 1863. Type from Quito, Ecuador, *Cuming* p. p. (Herb. Berol.). This is placed here following Christensen in Index Filicum, although from the description it might equally well be a form of *H. plumieri.*

Rhizomes widely creeping, about 0.6 mm. in diameter, densely hairy; fronds pendent; stipes elongate, (4.5) 8–16 cm. long, nonalate throughout, 0.5–1 mm. in diameter, conspicuously pubescent the hairs mixed (simple, forked, and stellate and long-stalked); blades ovate-oblong, 17–30 cm. long, 6–14 cm. broad, the rhachis nonalate below, alate upwardly; pinnae widely spreading, 15–20 pairs, all sessile or adnate, lanceolate or ovate-lanceolate, 3–7 cm. long, 1.5–2.5 cm. broad at base, acuminate at apex, deeply pinnatifid, the costa narrowly winged; pinnules 8–14 pairs, the lower deeply pinnatifid, with 3 or 4 pairs of segments, each with a simple (or occasionally forked) vein, the ultimate segments 0.7–1.4 mm. broad; hairs of rhachis stellate, subsessile or stalked, 3- or 4-rayed, the rays 1-celled, those of the leaf surfaces and veins scattered, stellate, subsessile, 3–5-rayed, those of the margins 3- or 4-rayed, subsessile, or some of them bistellate, the primary branches very short; indusia slightly immersed at base, the valves 0.4–0.7 mm. long, 0.3–1.2 mm. broad, equal, long-ciliate, most of the hairs stellate, stalked.

TYPE: Caracas, Venezuela, *Linden* 173.

RANGE: Venezuela, Colombia, and Ecuador (?), at middle and high elevations.

SPECIMENS EXAMINED:

VENEZUELA: Páramo de Aricagua, Mérida, alt. 2,700 meters, *Jahn* 1009.

COLOMBIA: At elevations of 1,700 to 3,600 meters: *Lehmann* 4932.[9] Between Pamplona and Toledo, Norte de Santander, *Killip & Smith* 19930 (G, NY, US). Salto de Tequendama, Cundinamarca, *Triana* 199 (NY, US). Pasca, Cundinamarca, *André* 1553 (NY), 1559 (NY, US). Boquerón de Bogotá, Cundinamarca, *André* 1559 bis (NY). Between Río Buez and Río Piedras, Antioquia, *Lehmann* 3128. Páramo de Moras, El Cauca, *Lehmann* 2656. Páramo de Buena Vista, El Cauca, *Pittier* 1192. La Cumbre, El Valle, *Killip* 11347 (NY, US). La Ceja, Tolima, *Lehmann* 6392 (G, US).

In general appearance the present species suggests *H. trapezoidale* and *H. ruizianum,* from which it is most easily separated by the presence of stellate hairs on the leaf surfaces.

40. Hymenophyllum interruptum Kunze, Linnaea **9**: 107. 1834; Anal. Pter. 48. *pl. 30.* 1837.

Sphaerocionium interruptum Presl, Hymenoph. 34. *pl. 10, f. C.* 1843.

?*Hymenophyllum aequabile* Kunze ex Klotzsch, Linnaea **20**: 438. 1847. Type from Mérida, Venezuela, *Moritz* 340 (isotype US). The specimen at hand is poor and may possibly not be referable here.

Rhizomes creeping, about 0.3 mm. in diameter, persistently hairy; fronds pendent, indeterminate; stipes up to 8 cm. long, about 0.5 mm. in diameter, nonalate or rarely with the lowest pinnae short-decurrent, deciduously hairy, the hairs mostly forked, some stellate, 3- or 4-rayed; blades linear, 13–40 cm. long, 3–7 cm. broad, the rhachis nonalate toward base, alate upwardly, the wings narrow, less than 1 mm. broad; pinnae 15 to many pairs, ovate to ovate-lanceolate,

[9] This is doubtless an erroneous number. According to the Lehmann field notebook, No. 4932 is a *Psychotria.*

often subfalcate, 2–5 cm. long, 8–14 mm. broad at base, acuminate at apex, deeply pinnatifid; segments 6–12 pairs, the lowest with mostly twice-dichotomous veins, the ultimate segments 0.5–2 mm. long, narrow, usually less than 1 mm. broad; hairs of leaf surfaces and veins few, stellate, 3–5-rayed, short-stalked, the marginal ones mostly forked, long-stalked, some twice-forked or stellate and 3-rayed; fronds interruptedly fertile, the groups of fertile pinnae separated by several sterile pinnae; sori immersed at base, the valves suborbicular, a little unequal, about as long as broad, usually about 1 mm. broad.

TYPE: Pampayacu, Huánuco, Peru, *Poeppig* 1104.

RANGE: Venezuela (?), Colombia, Peru, and Bolivia, at elevations of 750 to 2,500 meters.

SPECIMENS EXAMINED:

COLOMBIA: Quetamé, Cundinamarca, *Dawe* 324. Between Alto del Loro and Alto de Santa Inés, Norte de Santander, alt. 1,800–2,200 meters, *Cuatrecasas et al.* 12547.

PERU: Schunke Hacienda, above San Ramón, Junín, *Killip & Smith* 24850 (NY, US); *Schunke* A245. Chanchamayo Valley, Junín, *Schunke* 183. Porvenir, Pichis Trail, Junín, *Killip & Smith* 25899 (NY, US). Hatún, Sombreruyoc, Cuzco, *Bües* 801, 806, 813. Altura del Río Lachoc, Valle de Lares, Cuzco, *Bües* 1814, 1815, 1819.

BOLIVIA: Nairapi, between Soratá and Tipuani, *Cárdenas* 1277. Paradiso, *Williams* 1215 (NY, US). Yungas, *Bang* 349 (G), 436 (G, NY, US); *Rusby* 135 (NY, US). Songo, *Bang* 904 (NY, US). Mapiri, *Rusby* 183 (G, NY, US). Hacienda Simaco, above Tipuani, *Buchtien* 5290 (G, US). Polo-Polo, near Coroico, *Buchtien* 3568 (G, US), s. n. (G, NY). Incachaca, Cochabamba, *Steinbach* 9141 (G, NY). Comarapa, *Steinbach* 8373 bis (G).

This and the following four species could perhaps be considered a single collective species, the several subspecies more or less geographically isolated. However, the present treatment seems to accord equally well with the facts.

41. Hymenophyllum superbum Morton, sp. nov.

Stipites elongati, non vel vix alati; laminae pendulae, indefinitae, lineares, rhachibus ubique alatis, alis non undulatis, latis; pinnae numerosae, lanceolatae, apice acuminatae, pinnatifidae, segmentis numerosis, basalibus superioribus pinnatim venosis, medialibus cum venis furcatis ramis inaequalibus; pili in superficiebus et venis stellati, breviter stipitati, in marginibus plerumque bistellati, 2–4-radiati; indusia leviter immersa, suborbicularia, parva.

Rhizomes creeping, about 0.3 mm. in diameter, persistently hairy; fronds pendent, indeterminate; stipes 7.5–16 cm. long, 0.5–0.6 mm. in diameter, not alate except sometimes slightly at apex by the decurrent bases of the pinnae, deciduously pilose, the hairs mostly stellate, long-stalked, 3–5-rayed, a few twice stellate or merely forked; blades up to 70 cm. long, 4.5–8 cm. broad, the rhachis alate throughtout, the wings about 1 mm. broad; pinnae 20 pairs or more, lanceolate, ascending, 2.5–7 cm. long, 7–17 mm. broad at base, acuminate at apex, deeply pinnatifid; primary segments 9 pairs or more, the basal superior ones with subpinnate venation, the middle with furcate veins with unequal branches, the upper with simple veins, the ultimate segments short, about 1 mm. broad; hairs of rhachis, leaf surfaces, and veins all stellate, short-stalked, the marginal ones mostly bistellate, the rays few (2–4)-rayed; indusia shallowly immersed at base, narrower than the segments, the valves suborbicular, slightly less than 1 mm. long, ciliate, the hairs stellate.

Type in the U. S. National Herbarium No. 1616024, collected in the valley of the Río Palora, eastern slope of the Eastern Cordillera, Ecuador, at an elevation of 1,400 meters, by A. Rimbach (No. 12).

Collections with the same data as the type but with the addition of the date (November 1906) are in the National Herbarium, distributed by Rosenstock under the name *H. interruptum* as his Filices Ecuadorenses Exsiccatae No. 15. Other specimens from the same locality are *Rimbach* 19 and 19A.

42. Hymenophyllum dependens Morton, sp. nov.

Rhizoma repens; frondes pendulae, indefinitae, stipitibus brevibus, dense pilosis, apice alatis; laminae lineares, rhachibus late alatis; pinnae multae, patentes, acutae vel acuminatae, adnatae, leviter pinnatifidae, segmentis numerosis, venis bis- vel ter-dichotomis, non alatis, segmentis ultimis brevibus; pili in superficiebus et venis stellati, longe stipitati, 4–7-radiati, in marginibus plerumque bistellati; sori apicales, segmentis angustiores, vix immersi, valvis suborbicularibus.

Rhizomes wide-creeping, 0.3–0.4 mm. in diameter, densely ferruginous-hairy; fronds pendent, indeterminate; stipes 1.5–6.5 cm. long, 0.3–0.6 mm. in diameter, alate at apex, densely pilose, the hairs partly simple and several-celled, partly forked and long-stalked, the stalk and rays often 2 cells long or more, or stellate, 3- or 4-rayed, a few twice stellate; blades linear, normally 15–35 cm. long, 3–5.5 cm. broad, abruptly or rather abruptly reduced at base, the rhachis broadly alate throughout; pinnae 15–40 pairs, horizontally spreading, 1.5–3.5 cm. long, 7–11 mm. broad, acute or acuminate at apex, adnate at base, rather shallowly pinnatifid; segments 5–9 pairs, the lower with twice or three times forked veins, the ultimate segments short, 0.5–2 mm. long, 1–1.5 mm. broad, not undulate; hairs of rhachis stellate, long-stalked, or some twice stellate, those of the leaf surfaces and veins abundant, all stellate, 4–7-rayed, long-stalked, the marginal ones mostly bistellate, long-stalked, 4-rayed or more; sori borne chiefly on the apical segments of the pinnae, the indusia scarcely immersed at base, narrower than the segments, the valves suborbicular, about 0.8 mm. long, 0.8–1.2 mm. broad, long-ciliate, the hairs stellate or bistellate.

Type in the U. S. National Herbarium, No. 1043090, collected above Cascada Chorron, south of Antizales, Department of Bolivar, Colombia, at an elevation of 2,000 to 2,500 meters, February 25, 1918, by F. W. Pennell (No. 4391). Isotypes in the Gray Herbariun and the New York Botanical Garden.

RANGE: Trinidad, Venezuela, Colombia, and Ecuador.

ADDITIONAL SPECIMENS EXAMINED:

TRINIDAD: Mount Tocuche, *Broadway* 7114. Cabueres de Aripo, April 27, 1862, Trinidad Bot. Gard. Herb. 306. Without locality, *Prestoe* (Trinid. Bot. Gard. Herb. 1200) (NY, US).

VENEZUELA: Colonia Tovar, *Fendler* 481 (G, US).

COLOMBIA: La Cumbre, El Valle, alt. 2,000–2,500 meters, *Pennell & Killip* 5799 (NY, US); *Killip* 11366 (NY, US). La Costa, El Tambo, El Cuaca, alt. 1,400 meters, *von Sneidern* 563.

ECUADOR: Río Blanco, alt. 1,600 meters, *Mille* s. n.

43. Hymenophyllum sieberi (Presl) v. d. Bosch, Ned. Kruid. Arch. **4**: 414. 1859.

Sphaerocionium sieberi Presl, Hymenoph. 58. 1843.

Hymenophyllum wercklei Christ, Bull. Herb. Boiss. II. **4**: 940. 1904. Type from Costa Rica, *Wercklé* 247 (isotype US).

Sphaerocionium wercklei Copel. Phil. Journ. Sci. **67**: 31. 1938.

Rhizomes creeping, 0.3–0.5 mm. in diameter, persistently hairy; fronds pendent, indeterminate; stipes 1.5–8 cm. long, 0.4–0.5 mm. in diameter, conspicuously alate above middle, deciduously hairy, the hairs simple, forked, or stellate and 3-rayed; blades linear, 12–30 cm. long, 2.5–8 cm. broad, the rhachis alate through-

out, the wings less than 1 mm. broad; pinnae close, subimbricate, broadly lanceolate, 2–5 cm. long, up to 1.8 cm. broad at base, acuminate at apex, rather shallowly pinnatifid; primary segments 5–13 pairs, the lower with the veins subpinnately branched, the middle with forked veins with unequal branches, the upper with simple veins, the ultimate segments very short, 1 mm. long or less, less than 1 mm. broad; hairs of the leaf surfaces and veins few, stellate, 3–5-rayed, subsessile, the marginal ones forked or stellate and 3-rayed, rather long-stalked, a few bistellate; indusia slightly immersed at base, the valves longer than broad, subequal, about 1.5 mm long.

TYPE: Martinique, *Kohaut* (Sieber exs. 71).

RANGE: Puerto Rico, Martinique, Guadeloupe, Mexico, Guatemala, and Costa Rica, at elevations of 600 to 1,700 meters.

SPECIMENS EXAMINED:

PUERTO RICO: El Yunque, *Sargent* 323; *Blomquist* 12741.

MARTINIQUE: Mount Pelée, *Duss* 4574. La Calabase, *Duss* 1520. Vallée du Lorrain, *Stehlé* 3446.

GUADELOUPE: *L'Herminier* (sec. Christ).

MEXICO: Río Pedro, Chiapas, *Muench* 11.

GUATEMALA: Department of Alta Verapaz: *Cook & Doyle* 23c; *Pittier* 337; *Hatch & Wilson* 194; *Standley* 71622; *H. Johnson* 363, 593, 910, 911; *von Tuerckheim* 12a, 647 p.p., II. 1986, II. 2081. Some of the Guatemalan specimens are more or less aberrant.

COSTA RICA: *Cooper* 404a. Las Nubes to La Palma, *Knight*. La Palma, *Maxon & Harvey* 7979; *Brade*. San Gerónimo, *Wercklé* 565, 574. San Ramón, *Brenes* (Herb. Nac. Cost. 14211). Goat Island, Reventazón River, *Hatch* 119.

44. Hymenophyllum plumieri Hook. & Grev. Icon. Fil. **2**: *pl. 123*. 1829.

Sphaerocionium plumieri Presl, Hymenoph. 34. 1843.

Hymenophyllum splendidum var. *apodum* Sodiro, Anal. Univ. Quito **6**: 153. 1892; Crypt. Vasc. Quit. 22. 1893. Type from Volcán Cotacachi, Ecuador, *Sodiro*.

Rhizomes about 0.3 mm. in diameter, persistently hairy; fronds pendent, indeterminate; stipes 1–8 cm. long, 0.4–0.6 mm. in diameter, alate at apex, deciduously pubescent, the hairs mostly forked (the stalk and rays often 2 or 3 cells long), a few simple or stellate and 3-rayed; blades linear, 20–50 cm. long, 4–7 cm. broad, the rhachis broadly alate throughout; pinnae 15 to many pairs, spreading or a little ascending, 1.5–6 cm. long, 8–20 mm. broad, acute, deeply pinnatifid; primary segments 4–8 pairs, the lower with twice or three times dichotomous veins, the ultimate segments 2–3 mm. long, 1–1.5 mm. broad; hairs of leaf surfaces and veins few, stellate, short-stalked, 4- or 5-rayed, the marginal ones mostly stellate and 3-rayed, those toward the apices of the segments for the most part merely forked at base; sori borne on most of the segments of fertile pinnae, the indusia slightly immersed at base, narrower than the segments, the valves suborbicular, about 1 mm. long, 1.2 mm. broad, long-ciliate, the hairs mostly simple or forked.

TYPE: Western slopes of Mount Pichincha, Ecuador, *Jameson*.

RANGE: Ecuador, at elevations of 1,800 to 2,400 meters.

SPECIMENS EXAMINED:

ECUADOR: *Couthouy* 63 (G); *Jameson* 68 (NY), 73 (NY), 235 (G). Anque, *Lehmann* 125. Tandapi, *Mille* in 1921. Loja, *André* K105 (NY). Nono, Pichincha, *Sodiro* in 1899 (NY). Volcán Cotacachi, *Sodiro* (NY, US).

Hooker and Greville's description and plate were based on the Jameson specimen cited above as type. However, in addition they cited Plumier's plate 50B as representing their species, whence the specific name employed. This illustration

shows a quite different species, and is as a matter of fact the basis of *Trichomanes hirsutum* L., i. e., *Hymenophyllum hirsutum* (L.) Swartz (*H. ciliatum* Swartz).

45. Hymenophyllum sericeum (Swartz) Swartz, Journ. Bot. Schrad. **1800**[2]: 99. 1801.

Trichomanes sericeum Swartz, Prodr. Veg. Ind. Occ. 136. 1788.

Phorobolus domingensis Desv. Mém. Soc. Linn. Paris **6**: 291. 1837. Based on Plumier *pl. 73*.

Sphaerocionium sericeum Presl, Hymenoph. 34. 1843.

Hymenophyllum cubense Sturm, Bot. Zeit. **1859**: 298. 1859. Type from Monte Verde, Oriente, Cuba, *Wright* 904 (isotype US).

Hymenophyllum fuertesii Brause, in Urban, Symb. Antill. **7**: 484. 1913. Type from Provincia de la Vega, Dominican Republic, *Fuertes* 1772 (isotype US).

Rhizomes creeping, 0.2–0.3 mm. in diameter; fronds pendent, indeterminate; stipes 2–5.5 cm. long, 0.2–0.5 mm. in diameter, nonalate, deciduously pubescent, the hairs mixed (simple, forked, and stellate); blades linear, normally 10–30 cm. long (rarely only 5 cm. long, in depauperate plants), 2–3.5 cm. broad, rounded at apex, the rhachis nonalate below, narrowly alate upwardly on alternate sides by the decurrent bases of the pinnae; pinnae normally 20–30 pairs, strongly ascending, ovate-lanceolate, 1.5–2.5 cm. long, 5–6 mm. broad at base, acute at apex, the lower petiolulate, the upper sessile or adnate, pinnatifid; segments 4 or 5 pairs, the superior basal one bifid, the others simple, the ultimate segments about 1 mm. broad; hairs of leaf surfaces, veins, and margins numerous, stellate, subsessile, 5- or 6-rayed, the rays elongate, about 0.5 mm. long, 1-celled; veins on both sides of the frond bearing 2 rather narrow, green wings; sori usually few, confined to the tips of the upper pinnae, the valves about 1 mm. long and broad, equal, slightly immersed at base.

TYPE: Jamaica, *Swartz* (fragment US).

RANGE: Cuba, Hispaniola, Jamaica, Martinique, and Guadeloupe, in wet, mountain forests.

SPECIMENS EXAMINED:

CUBA: Sierra Maestra, Sierra de Nipe, and Sierra Moa, at elevations of 400 to 1,350 meters: *Morton & Acuña* 3702, 4500; *Ekman* 1693, 6961, 14412; *Hioram & Clément* 6513; *Clément* 788; *Acuña* 9953; *Shafer* 3894, 8119, 8132.

DOMINICAN REPUBLIC: Loma Cana, Jicomé, alt. 650 meters, *Valeur* 359. Loma Marian Chicle, alt. 800 meters, *Ekman* H 14255.

HAITI: Morne la Selle, alt. 1,700 meters, *Holdridge* 1333. Furcy, alt. 1,300 meters, *Leonard* 4656.

JAMAICA: Blue Mountains, at elevations of 600 to 1,900 meters: *Hart* 8; J. P. 226; *McNab; Wright; Clute* 98; *Harris* 7108; *E. G. Britton* 1134; *Watt* 106; *Maxon* 909, 1063, 1303, 9644, 9716, 9729, 10555; *Maxon & Killip* 666, 1017.

MARTINIQUE: Mount Pelée, *Duss* 1517.

GUADELOUPE: *L'Herminier*. Matouba, *Duss* 4266. Grandes Icaques, alt. 970–1,100 meters, *Duss* 4279.

Although the present species has been assigned a wide range in the American Tropics, it appears properly to be confined to the West Indies. As a matter of fact, the various South American species confused with it are not very closely allied.

46. Hymenophyllum horizontale Morton, sp. nov.

Frondes pendulae, indefinitae, stipitibus brevibus, apice alatis, pubescentibus, pilis simplicibus, elongatis, 2- vel 3-cellularibus, vel furcatis, stipitibus et ramis saepe 2-cellularibus; laminae lineares, apice acutae, basin versus angustatae, rhachibus ubique alatis; pinnae horizontales, oblongae vel oblongo-lanceolatae, apice obtusae, leviter lobatae, costa late alata, segmentis numerosis; venae subtus

alatae, alis valde inconspicuis, interruptis; pili in superficiebus et venis numerosi, stellati, longe stipitati, 4–7-radiati, in marginibus stellati et bistellati, 3- vel 4-radiati; sori numerosi, fere usque ad pinnarum basin dispositi, valvis immersis, suborbicularibus, stellato-pilosis et ciliatis.

Rhizome 0.3 mm. in diameter, densely red-hirsute; fronds pendent, indeterminate; stipes 1–4.5 cm. long, 0.3–0.4 mm. in diameter, alate at apex, pubescent, the hairs partly simple, elongate, 2- or 3-celled, partly forked, the stalk and branches often of more than 1 cell; blades linear, (7) 14–30 cm. long, (2.5) 3–6.5 cm. broad, acute at apex, narrowed toward base, the rhachis alate throughout; pinnae many pairs, horizontally spreading, oblong to oblong-lanceolate, 1.5–3 cm. long, 0.6–1 cm. broad, obtuse at apex, shallowly lobed, the costa very broadly alate (the wing 2 mm. broad or more); segments 7–10 pairs, the lower superior ones with the veins 3 or 4 times dichotomous, the ultimate segments very short, not over 1 mm. long, about 1 mm. broad; veins winged on the lower side of the frond, the wings very inconspicuous, widely interrupted, present chiefly at the forks of the veins; hairs of rhachis stellate, the stalks partly short, partly elongate and several cells long, 4- or 5-rayed, or partly twice-stellate, those of the leaf surfaces and veins abundant, all stellate (or sometimes twice-stellate), long-stalked, 4–7-rayed, the marginal ones stellate or bistellate, the stalk about 0.25 mm. long, the rays 3 or 4; sori numerous, borne nearly throughout the length of the pinnae, the indusia deeply immersed at base, orbicular, about 1 mm. long and broad, stellate-pilose externally, long-ciliate, the hairs all stellate.

Type in the U. S. National Herbarium No. 1215226, collected at La Palma, Province of San José, Costa Rica, at an elevation of about 1,600 meters, March 17, 1924, by Paul C. Standley (No. 38114).

RANGE: Costa Rica.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: La Palma, *Maxon & Harvey* 7978; *M. Valerio* III. 40. La Hondura, alt. 1,300–1,700 meters, *Standley* 36350. Orosi, *Standley* 39609.

The only other Costa Rican species suggesting the present one in habit is *H. sieberi*. From it *H. horizontale* may be distinguished by the presence of wings on the veins of the lower side, by its horizontal, shallowly lobed pinnae, soriferous nearly to base, and by the more abundant and complicated type of pubescence.

47. Hymenophyllum lobato-alatum Klotzsch, Linnaea **20**: 438. 1847; Karsten, Fl. Col. **2**: *pl. 157, f. 5–7*. 1862–69.

Sphaerocionium interruptum sensu Klotzsch, Linnaea **18**: 535. 1844, not Presl, 1843.

Hymenophyllum lobato-papillosum Sadeb. in Engl. & Prantl, Nat. Pflanzenfam. **1**[4]: 110. 1899 (*sphalm.*).

Hymenophyllum pyramidatum var. *lobato-alatum* Hieron. Bot. Jahrb. Engler **34**: 433. 1904.

Fronds pendent, indeterminate; stipes 2.5–5 cm. long, 0.4–0.7 mm. in diameter, terete throughout or rarely a little alate at apex, deciduously pubescent, the hairs mixed (simple and several-celled, forked, the stalk and branches often of several cells, and stellate, 3-rayed, long-stalked); blades linear, up to 60 cm. long or probably more, 5–6 cm. broad, the rhachis alate throughout or rarely nonalate at base; pinnae many pairs, lanceolate, 2–4 cm. long, 9–16 mm. broad at base, acuminate at apex, rather deeply pinnatifid; pinnules 5–10 pairs, deeply emarginate or incised at apex, the veins mostly once-dichotomous; hairs of rhachis all stellate, the stalks partly short, partly elongate and several-celled, 4–6-rayed, a few twice-stellate, those of the leaf surfaces and margins rather few, short- or long-stalked, 3–5-rayed, the marginal partly bistellate or twice-forked; veins winged on the lower side of the frond only, the wings broad, interrupted, rather inconspicuous; indusia as wide

as the segments, slightly immersed at base, the valves about 1 mm. long, sparingly pilose externally, long-ciliate, the hairs all stellate, stalked.

TYPE: Province of Panatahua, Peru, *Ruiz* 83.

RANGE: Colombia to Peru, at elevations of 300 to 1,600 meters.

SPECIMENS EXAMINED:

COLOMBIA: Monte Capiro, near La Ceja, Antioquia, *Daniel* 649. Savaneta, eastern highlands of Santa Rosa, Antioquia, *Lehmann* 7585.

ECUADOR: *Spruce* (G, NY). Sabatá, near Archidona, Napo-Pastaza, *Mexia* 7297. Puyo, Napo-Pastaza, *Mexia* 6926 (G, US).

PERU: Between Balsapuerto and Moyobamba, Pampayacu, Loreto, *Klug* 3248 (G, NY, US). Hacienda Exito to Puente Durand, Mount Santo Toribio, Churubamba, Huánuco, *Mexia* 8258 (G, NY, US).

48. Hymenophyllum pyramidatum Desv. Mém. Soc. Linn. Paris **6**: 332. 1827.
Sphaerocionium pyramidatum Copel. Phil. Journ. Sci. **67**: 30. 1938.

Fronds pendent, indeterminate; stipes 2.5–9 cm. long, about 0.5 (rarely up to 0.7) mm. in diameter, terete at base, alate upwardly, deciduously pubescent, the hairs mixed (simple and several-celled, forked, or stellate, 3-rayed, the stalk often elongate and 2- or 3-celled); blades linear, up to 60 cm. long or more, up to 5.5 cm. broad, the rhachis alate throughout; pinnae normally 50 pairs or more, often crowded and subimbricate, linear-lanceolate, the larger 2.5–3.7 cm. long, 7–10 mm. broad near base, acuminate at apex, adnate at base, rather shallowly pinnatifid, the costa broadly winged; segments normally 10 pairs or more, each 2-veined, deeply emarginate; hairs of rhachis stellate, the stalks partly short, partly elongate, several-celled, the rays 7–9, or some of them twice-stellate, those of the leaf surfaces and vein wings stellate, long-stalked, 4–8-rayed, the marginal forked or stellate, 3- or 4-rayed, long-stalked; veins winged on both sides of the frond, the wings conspicuous on the lower side, green, membranaceous, more or less continuous, sometimes rather obscure on the upper side; indusia confined to the tips of the pinnae, about one-half immersed, about 2 mm. long, long-ciliate, the hairs stellate, long-stalked.

TYPE: "Habitat in America calidiori." The type in the Desvaux Herbarium (photograph G, US) does not indicate the locality or collector. It was probably collected in Peru by Dombey.

RANGE: Peru and Bolivia, at elevations of 1,200 to 1,900 meters.

SPECIMENS EXAMINED:

PERU: Hacienda Schunke, above San Ramón, Junín, *Schunke* A241. La Merced, Junín, *Macbride* 5632. Chanchamayo Valley, Junín, *Schunke* 466, 926. Dos de Mayo, Pichis Trail, Junín, *Killip & Smith* 25869 (NY). Pampayacu, Huánuco, *Kanehira* 123 (G, US). "Peruvian Andes," *Mathews* 1090.

BOLIVIA: Hacienda Casana, Tipuani Valley, *Buchtien* 7065 p. p. Ticunhuaya, *Tate 1053*.

From the photograph, the type seems to be a mixture. The smaller frond at the left shows clearly the wings on the veins typical of the plant which has usually been called *H. pyramidatum*. This frond may be taken as the type. The larger frond on the right seems to lack wings on the upper surface and is probably referable to *H. lobato-alatum* Klotzsch. The illustration of this species by Karsten (Fl. Col. **2**: *pl. 157, f. 1–4*) seems to represent *H. verecundum*. The material used for the illustration is not indicated, but it surely was not the Desvaux type.

49. Hymenophyllum verecundum Morton, sp. nov.

Frondes pendulae, indefinitae, stipitibus brevibus, teretibus vel raro apice paullo alatis, primo hirsutis, pilis albidis, simplicibus vel furcatis, elongatis; laminae lineares, angustae, rhachibus ubique alatis vel basi nudis; pinnae numerosae, ovatae vel ovato-oblongae, parvae, obtusae, leviter pinnatifidae, venis plerumque

simplicibus vel semel dichotomis, segmentis ultimis brevibus, latis; pili in rhachibus, superficiebus, et venis numerosi, albidi, stellati, stipitati, 5–7-radiati, vel pauci bis-stellati, in marginibus stellati, subsessiles, plerumque 5-radiati; venae utrinque perspicue alatae, alis viridibus, membranaceis, interruptis; indusia pauca, apicalia, orbicularia, immersa, valvis externe pilosis, ciliatis.

Fronds pendent, indeterminate; stipes 2–5.5 cm. long, 0.4–0.5 mm. in diameter, usually terete, rarely a little alate at apex by the decurrent bases of the pinnae, deciduously hirsute, the hairs whitish, simple or forked, elongate; blades linear, 12–45 cm. long, 1–3.5 cm. broad, the rhachis alate throughout or often nonalate at base, the wings about 1 mm. broad; pinnae 25 pairs or more, ovate or ovate-oblong, the largest about 2.5 cm. long and 8 mm. broad, obtuse or rarely acutish, shallowly pinnatifid, the costa broadly winged; segments 3–6 (8) pairs, the veins once-dichotomous or simple, the basal ones sometimes with twice-dichotomous veins, the ultimate segments short and broad, about 1 mm. broad, entire, not undulate; hairs of rhachis, leaf surfaces, and veins whitish, stellate, stalked, 5–7-rayed, some of them twice-stellate, the marginal stellate, subsessile, mostly 5-rayed; costae and veins winged on both sides of the blade (sometimes obscurely so above), the wings membranaceous, green, conspicuous, partially interrupted; indusia few, apical on the pinnae, immersed at base, the valves orbicular, about 1.2 mm. long, pilose externally, strongly ciliate, the hairs all stellate, stalked.

Type in the U. S. National Herbarium, No. 1706663, collected on trail from Puente Durand to Exito, crest of Santo Toribio, District of Churubamba, Department of Huánuco, Peru, on tree trunks in dense forest at an elevation of 600 meters, September 8, 1936, by Ynes Mexia (No. 8143a). Isotype at the Gray Herbarium.

RANGE: Peru and Bolivia, at elevations of 600 to 2,700 meters.

ADDITIONAL SPECIMENS EXAMINED:

PERU: Porvenir, Pichis Trail, Junín, *Killip & Smith* 25948 (NY, US). Hacienda Pintobamba, Abra de Chaupimayo, Cuzco, *Bües* 1943. Western slopes of the Andes, *Pearce* in 1861–63.

BOLIVIA: Locatal, *Herzog* 2268. Near Pararani, between Soratá and Mapiri, *Cárdenas* 1038 (G). Incachaca, Cochabamba, *Steinbach* 8895 (G). Between Incachaca and Chusi, Cochabamba, *Steinbach* 9142 (G, NY, US).

This species has been variously identified. The type collection was distributed as *Sphaerocionium sericeum*, a species entirely different in the shape and dissection of the pinnae and in its very narrow and inconspicuous vein-wings. The Steinbach specimens have been identified as *H. fusugasugense* Karst., which differs in its nonalate rhachises, among other characters. The Herzog specimen was distributed as *H. tomentosum* Kunze, a species which from description belongs to the group of species with nonalate rhachises. The Pearce specimen was distributed as *H. pyramidatum*, doubtless its closest ally, which differs in its alate stipes, and larger pinnae, these linear-lanceolate and acuminate, rather than ovate or ovate-oblong and obtuse.

50. Hymenophyllum plumosum Kaulf. Enum. Fil. 267. 1824; Karst. Fl. Col. **2**: *pl. 156, f. 1–4.* 1862–69.

Sphaerocionium aureum Presl, Hymenoph. 34, 57. 1843. Type from Serra da Estrella, Brazil, *Beyrich.*

Sphaerocionium plumosum Copel. Phil. Journ. Sci. **67**: 30. 1938.

Fronds pendent, indeterminate; stipes 2–6 cm. long, about 0.5 mm. in diameter, nonalate throughout, persistently pubescent, the hairs mixed (simple, forked, and stellate); blades linear, 17–60 cm. long, 3–6 cm. broad, the rhachis nonalate throughout; pinnae 25 pairs or more, often subimbricate, lanceolate, 2–4 cm. long, 7–12 mm. broad at base, acuminate at apex, cuneate at base, pinnatifid;

segments 7–12 pairs, the basal superior one with twice-dichotomous veins, the ultimate segments short, about 0.5 mm. broad; hairs of rhachis numerous, appressed, stellate, partly with short stalks, partly with elongate, several-celled stalks, 5–7-rayed, or some twice-stellate, those of the leaf surfaces, veins, and margins numerous, fine, appressed, ferruginous, stellate, subsessile, 4–7-rayed; costae and veins very minutely winged on both sides of the blade; indusia not immersed, usually broader than the segments, the valves about 1 mm. long, densely hirsute-tomentose.

TYPE: Brazil, *Chamisso*.

RANGE: Costa Rica, Panama, Colombia, Peru, Bolivia, and Brazil, in the Andes at elevations of 1,200 to 2,200 meters.

SPECIMENS EXAMINED:

COSTA RICA: Cerro del Gallito, *M. Valerio* A9. La Fuente, Peralta, *Lankester* 892. Volcán Barba, *Alfaro* 123; *M. Valerio* 93. La Palma, *Standley* 38115. Pacayas, *Lankester* 648. La Estrella, *Standley* 39388. Orosi, *Standley* 39653, 39864. Juan Viñas, *Tonduz* (Herb. Nat. Cost. 10141). Las Nubes, *Knight*.

PANAMA: El Boquete, *Killip* 5064; *Cornman* 1103; *Maxon* 5693. Cerro de la Horqueta, *Maxon* 5438. Bajo Mona, *Woodson & Schery* 589.

COLOMBIA: Cerro de la Vieja, near Sonsón, Antioquia, *Daniel* 1726a. El Santuario, Antioquia, *Daniel* 19. Savaneta, eastern highlands of Santa Rosa, Antioquia, *Lehmann* 7586. La Cumbre, El Valle, *Killip* 11327.

PERU: Schunke Hacienda, above San Ramón, Junín, *Killip & Smith* 24833, 24840 (NY, US). Pichis Trail, Eneñas, Junín, *Killip & Smith* 25733. Villacabamba, on Río Chinchao, Huánuco, *Macbride* 5146.

BOLIVIA: Yungas, *Rusby* 140 (NY). Hacienda Simaco, above road to Tipuani, *Buchtien* 5289 (NY, US).

BRAZIL: *Burchell* 2258 (G, US); *Sello* (G). Caxoeira, *Claussen* 100. Serra do Caparao, Espirito Santo, *Mexia* 4051 (G, NY, US). Alto Macahé, Rio de Janeiro, *Glaziou* 4444 (NY, US). Serra da Estrella, Rio de Janeiro, *Riedel*. Caraca, Minas Gerais, *M. & N. Foster* 710a (G, US). Serra de Ouro Preto, Minas Gerais, *Ule* 252. Novo Friborgo, São Paulo, *Goebel* s. n. (NY).

This species closely resembles *H. karstenianum* and *H. speciosum* in cutting and pubescence but differs in the winged veins and the usually papillose leaf tissue. The wings are very minute and can be seen readily only under a rather high magnification.

51. Hymenophyllum multialatum Morton, sp. nov.

Frondes pendulae, indefinitae, stipitibus brevibus, non alatis, parce hirsutis, pilis plerumque simplicibus, 2–4-cellularibus, paucis furcatis vel triradiatis; laminae lineares, rhachibus rectis, non alatis; pinnae numerosae, infimae petiolulatae, superiores sessiles, patentes, saepe obtusae, pinnatifidae, segmentis plerumque semel furcatis; pili in rhachibus, superficiebus venisque stellati, multiradiati, stipitati, interdum bis-stellati, in marginibus stellati vel bistellati, stipitati, 3–4-radiati; venae utrinque alas interruptas virides conspicuas gerentes; indusii valvae suborbiculares, subtruncatae, externe parce pubescentes, perspicue ciliatae.

Rhizomes long-creeping, slender, about 0.4 mm. in diameter, densely hirsute; fronds pendent, indeterminate; stipes 5–10 cm. long, slender, about 0.5 mm. in diameter, not alate, sparsely hirsute, the hairs mostly simple, 2-celled or more, a few forked or stellate and 3-rayed; blades linear, up to 45 cm. long (or probably more) and 15 cm. broad, the rhachis straight, not alate even at apex; pinnae numerous, the lowest short-petiolulate, the upper sessile, spreading, normally linear-oblong (rarely elongate and frondlike), obtuse or acutish, deeply pinnatifid, the costal wing about 1 mm. broad; segments numerous, nearly all bifid, the ultimate segments about 1 mm. broad; hairs of rhachis stellate, brownish, numer-

ous, 5–8-rayed, partly with short stalks, partly with elongate, several-celled stalks, or some of them twice-stellate, those of the leaf surfaces and veins scattered, stellate, 3–6-rayed, long-stalked, the marginal stellate, or bistellate, 3- or 4-rayed; veins on both sides of the frond bearing numerous conspicuous, green wings (sometimes obscure above), these irregularly interrupted; sori on the apical lobes of the pinnae, the indusium scarcely immersed, a little broader than the segments, the valves suborbicular, 1.2–1.7 mm. long, subtruncate at apex, sparsely pubescent externally, long-ciliate.

Type in the U. S. National Herbarium, No. 1515591, collected at Alturas de Sieve, Provincia de la Convención, Department of Cuzco, Peru, at an elevation of 3,300 meters, June 1924, by C. Bües (No. 1575).

RANGE: Colombia to Peru, at elevations of 3,000 meters or more.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Páramo de Gúanacas, El Cauca, *Lehmann* 6398 p. p.

ECUADOR: Chuquiribamba, *André* K 111 (NY).

PERU (all from the Department of Cuzco): Camino del Cerro, Ampares, Alturas de Chaco, *Herrera* 2140. Alturas de Sieve, *Bües* 1557, 1578. Montaña de Calca, Valle de Lares, *Bües* 1916, 1919, 1923, 1932. Monte de Incienso, Huadquiña, *Bües* 724, 726. Tambohuaicco, Huadquiña, *Bües* 1345. Hacienda Amaybamba, Cerro San Marino, *Bües* 541. Cochapata, Valle de San Miguel, *Bües* 2180, 2183. Valle de San Miguel, *Bües* 2075, 2135.

The Lehmann specimen cited above was identified by Hieronymus (Bot. Jahrb. Engler **34**: 433. 1904) as *H. pyramidatum* Desv. It is a mixture of the present species and *H. lobato-alatum* Klotzsch.

52. Hymenophyllum fusugasugense Karst. ex Sturm, Bot. Zeit. **1859**: 297. 1859; Karst. Fl. Col. **2**: 107. *pl. 155, f. 1–8.* 1862–69.

? *Hymenophyllum asterothrix* Kunze, Farnkr. **1**: 160. 1844 (*nom. nud.*); v. d. Bosch, Ned. Kruid. Arch. **5**[3]: 182. 1863 (*nom. abort.*). Kunze's plant was collected by Mathews in Peru. Van den Bosch took up the name in the sense of *H. fusugasugense*, perhaps erroneously.

Fronds pendent, indeterminate; stipes 2–9 cm. long, 0.5–0.6 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mostly simple, of several cells, a few forked; blades linear, 17–45 cm. long, 2–5 cm. broad, the rhachis nonalate throughout; pinnae 25 pairs or more, lanceolate to linear-lanceolate, 1.5–3.5 cm. long, 5–10 mm. broad at base, usually imbricate, obtuse to acuminate at apex, cuneate at base, all sessile, deeply pinnatifid; segments 4–8 pairs, the basal superior ones with twice-dichotomous veins, the ultimate segments very short; hairs of rhachises, leaf surfaces, and veins not appressed, numerous, stellate, 4–7-rayed, the stalks elongate, often of several cells, or some twice-stellate, those of the margins stellate, short-stalked, 3- or 4-rayed; veins alate on both sides of the frond (sometimes inconspicuously so above), the wings broad, membranaceous, toothed; indusia immersed at base, the valves 1.5–2 mm. long, suborbicular, densely hirsute-tomentose.

TYPE: Fusugasugá, Cundinamarca, Colombia, *Karsten.*

RANGE: Colombia, at elevations of 2,500 to 3,400 meters.[10]

SPECIMENS EXAMINED:

COLOMBIA (Departments of Santander, Cundinamarca, and Antioquia): *Mutis* 3202, 3203, 3208; *Killip & Smith* 18164 (NY, US); *Holton* 72 (G, NY, US); *Dawe* 178; *Cuatrecasas* 5403 (G, US); *Triana* 206 (NY), s. n. (US); *Schultze* 138; *Apollinaire Marie; Guevara A.* A35 (G, US); *Tomás* 415; *Ariste Joseph* A186, A204, s. n. (NY, US).

[10] Reported from Venezuela by Sturm and from Ecuador by van den Bosch, but the records need to be verified.

52a. Hymenophyllum fusugasugense var. **aberrans** Morton, var. nov.

A var. typica venis supra non alatis differt.

Type in the U. S. National Herbarium, No. 1519255, collected at Tabay, Mucuntután, Mérida, Venezuela, at an elevation of 2,500 to 2,800 meters, October 20, 1930, by W. Gehriger (No. 584). Isotype at the Gray Herbarium.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Without special locality, *Hartweg* 1506. Pinares, above Salento, Caldas, alt. 2,700–3,200 meters, *Pennell* 9248 (NY, US), 9399 (NY, US).

This variety, differing from the typical in having the veins nonalate on the upper side of the frond, is the plant treated by Karsten as *H. tomentosum* Kunze, mentioned below. However, it is not certain that Karsten saw authentic material of Kunze's species, which was described from Peru. The present plant is known to me only from Venezuela and Colombia. Since Kunze's description does not indicate this variety, I assign a new name and treat Kunze's species as dubious for the present, for it may very well represent an entirely different species. The variety *aberrans* is perhaps an artificial one only, for although typically *H. fusugasugense* has the veins conspicuously winged on both sides of the frond, some specimens have them only very inconspicuously winged on the upper side, and thus approach closely to the variety.

DUBIOUS SPECIES

HYMENOPHYLLUM CRISPATULUM v. d. Bosch, Ned. Kruid. Arch. **4**: 412. 1859.

TYPE: Peru, *Lechler*.

From the unsatisfactory original description I am unable to identify this species. Sadebeck referred it to *H. hirtellum* Swartz, but this seems improbable.

HYMENOPHYLLUM DIVERSILOBUM (Presl) Fée, Mém. Foug. **11**: 118. 1866.

Sphaerocionium diversilobum Presl, Hymenoph. 34, 59. 1843.

TYPE: Based on material of unknown origin, perhaps, according to Presl, collected in Hispaniola by Bertero.

The identity of this species has never been ascertained since Presl's time. None of the species here described answer to the description, which calls for a plant with linear-lanceolate blades, the lower pinnae with three pinnules, the middle with two, and the upper simple. The rhachis and stipe are alate. The hairs are confined to the margins and all are simple. If the description is correct, the species must come nearest to *H. crispum*.

HYMENOPHYLLUM PALMENSE Rosenst. Repert. Sp. Nov. Fedde **22**: 5. 1925.

Sphaerocionium palmense Copel. Phil. Journ. Sci. **67**: 31. 1938.

TYPE: La Palma, Costa Rica, *Brade* 600 (not seen).

From description I am unable to separate this species from *H. hemipteron* Rosenst. However, since Rosenstock described the two at the same time and did not compare them with each other, but *H. palmense* with *H. lineare* Swartz, and *H. hemipteron* with *H. pulchellum* Schlecht. & Cham., I hesitate to make a definite reduction.

HYMENOPHYLLUM REFRONDESCENS Sodiro, Rec. Crypt. Vasc. Quit. 2. 1883.

Hymenophyllum sericeum var. *refrondescens* Sodiro, Anal. Univ. Quit. **6**: 230. 1892; Crypt. Vasc. Quit. 25. 1893.

TYPE: Santo Domingo de los Colorados, Ecuador, *Sodiro* (not seen).

From description I am unable to place this species satisfactorily. Elongate, frondlike pinnae are known in *H. trichophyllum*, *H. elegantulum*, and *H. rufum*, but from the strongly alate rhachis the present species is evidently not related to these.

HYMENOPHYLLUM TOMENTOSUM Kunze, Linnaea **9**: 107.1834; Farnkr. **1**: 160. *pl. 69.* 1844.

Sphaerocionium tomentosum Presl, Hymenoph. 34. 1843.

Dermatophlebium tomentosum Presl, Epim. 258. 1849.

TYPE: Pampayacu, Peru, *Poepping* (not seen).

See comment above under *H. fusugasugense* (p. 187).

HYMENOPHYLLUM TRIFIDUM Hook. & Grev. Icon. Fil. **2**: *pl. 196.* 1831.

Sphaerocionium trifidum Presl, Hymenoph. 34. 1843.

TYPE: Esmeraldas, Ecuador, *Jameson.*

From the figure this species most closely resembles *H. tenerrimum* v. d. Bosch, but I am unwilling to take up the name without examining the type. It is one of the species referred by Hooker to his collective "*H. lineare.*"

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2139. hirsutum.
2143. speciosum.
2148. amabile.
2150. amabile.
2168. amabile.
2170. amabile.
2178. speciosum.
2180. multialatum.
2183. multialatum.

BURCHELL, W. J.

2258. plumosum.
2259. pulchellum.
3546. pulchellum.
3560. hirsutum.
3720. hirsutum.
3721. elegans.

CÁRDENAS, M.

1038. verecundum.
1044. ruizianum.
1277. interruptum.
1976. hirsutum.

CHASE, A.

6469b. microcarpum.
6471b. lineare.
10712. elegans.

CHRYSLER, M. A.

1660. fragile.
1746. microcarpum.
1809b. lineare.

CLAUSSEN, M. P.

100. plumosum.

CLÉMENT, BRO.

777. lineare.
788. sericeum.
1398 p. p. hirtellum.
1398 p. p. microcarpum.
2183. lanatum.

CLUTE, W. N.

84. lanatum.
98. sericeum.
123. hirtellum.
274a. lineare.

CONZATTI, C., and GOMEZ, I. C.

3477. elegantulum.

CONZATTI, C., and GONZALEZ, V.

720. elegantulum.

COOK, O. F.

30. microcarpum.

COOK, O. F., and DOYLE, C. B.

23c. sieberi.
39. hirsutum.
57. pulchellum.
148. lineare.
150. lanatum.

COOK, O. F., and GRIGGS, R. F.

60. microcarpum.
400. fragile.
440. pulchellum.

COOPER, G. P.

106a. hirsutum.
404a. sieberi.

COOPER, J. J.

(Donn. Smith 6020). microcarpum.

CORNMAN, MRS. L. R.

1103. plumosum.
1175. semiglabrum.
1204. hemipteron.
1244. elegans.
1303. fragile.

COUTHOUY, J. P.

63. plumieri.
67. trichophyllum.

CRUZ, J. S., DE LA

2786. hirsutum.

CUATRECASAS, J.

5403. fusugasugense.
11700. ruizianum.
12449. microcarpum.
12547. interruptum.
13390. valvatum.
16291a. hirsutum.

CUMING, H.

23. microcarpum.

CURRAN, H. M., and HAMAN, M.

679. hirsutum.

CURTIS, J. T.

37. hirsutum.

DANIEL, BRO.

19. plumosum.
649. lobato-alatum.
1726a. plumosum.

DAWE, M. T.

178. fusugasugense.
323. microcarpum.
324. interruptum.

DUSÉN, P.

164. rufum.
713. hirsutum.
2935. pulchellum.
3362. elegans.
3447. hirsutum.
6524. pulchellum.
6773. microcarpum.

DUSS, PÈRE

1514. hirsutum.
1516. hirsutum.
1517. sericeum.
1519. latifrons.
1520. sieberi.
4265. latifrons.
4266. sericeum.
4267a. lanatum.
4268. elegans.
4269. hirsutum.
4274. hirsutum.
4279. sericeum.
4281. hirsutum.
4387. lineare.
4574. sieberi.

EGGERS, H. F. A.

5337. hirsutum.
6852 p. p. hirsutum.
6902. hirsutum.
6903. lanatum.

EKMAN, E. L.

1693. sericeum.
1694. hirsutum.
3883. lanatum.
5209. fragile.
6828. elegans.
6961. sericeum.
6987. hirtellum.
7173. microcarpum.
8861. hirsutum.
14412. sericeum.
14540. urbanii.
14798. hirtellum.
H1490. hirtellum.
H2547. microcarpum.
H4775. elegans.
H4859. hirsutum.
H4869. microcarpum.
H5452. microcarpum.
H7377. microcarpum.
H7687. urbanii.
H7721. fragile.
H11453. hirsutum.
H12004. elegantulum.
H12286. elegans.
H12395. hirsutum.
H12753. elegans.
H13834a. elegantulum.
H13834b. elegantulum.
H14035. hirtellum.
H14255. sericeum.

FENDLER, A.

33. microcarpum.
37. hirsutum.
38. fragile.
39 p. p. karstenianum.
86. hirsutum.
327. trichophyllum.
387. lanatum.
457. elegans f. minor.
481. dependens.

FOSTER, M., and FOSTER, N.

710a. plumosum.

FUERTES, M.

1448b. microcarpum.
1510 p. p. microcarpum.
1510 p. p. hirtellum.
1772. sericeum.
1817. urbanii.

GARDNER, J.

210. microcarpum.
213. hirsutum.

GEHRIGER, W.

584. fusugasugense var. aberrans.

GLAZIOU, M. A.

920. hirsutum.
1713. hirsutum.
1714. microcarpum.
2271. microcarpum.
2268. hirsutum.
2269. hirsutum.
2270. hirsutum.
2467. rufum.
3347. crispum.
3349. valvatum?
3356. hirsutum.
3491. elegans.
4441. hirsutum.
4444. plumosum.
6410. fragile.
7272. hirsutum.
7890. glaziovii.

GUEVARA A., BRO.

A34. trapezoidale.
A35. fusugasugense.

HARRIS, W.

7105. lineare.
7108. sericeum.
7113. fragile.

HART, J. H.

5. lineare.
8. sericeum.
65. urbanii.
129. lanatum.
203. crispum.
206. hirsutum.
217. fragile.
248. microcarpum.
372. crispum.

HARTWEG, C. T.

1506. fusugasugense var. aberrans.

HATCH, W. R.

119. sieberi.

HATCH, W. R., and WILSON, C. L.

18. hirsutum.
91. microcarpum.
98. microcarpum.
100. lanatum.
102. hirsutum.
176. maxonii var. angustius.
178. lanatum.
181. maxonii var. angustius.
183. microcarpum.
194. sieberi.
199. microcarpum.
216. fragile.
232. pulchellum.
239. maxonii var. angustius.
269. microcarpum.
372. pulchellum.

HAUGHT, O.

1795. hirsutum.
2078. hirsutum.

HAWEIS, S.

1. hirsutum.

HEILBORN, O.

700. elegantulum.

HENRI-STANISLAS, BRO.

1655. microcarpum.
1685. crispum.
1688c. trapezoidale.

HERRERA, F. L.

2140. multialatum.
2142. ruizianum.
2144. ruizianum.
3010. microcarpum.

HERZOG, T.

1906. speciosum.
1952. trichophyllum.
2268. verecundum.
3831. crispum.

HESS, W .E.

222. hirsutum.
308. microcarpum.

HINTON, G. B.

3268. trapezoidale.
14306. elegantulum.
14306a. crispum.

HIORAM, BRO., and CLÉMENT, BRO.

6363. hirsutum.
6510. hirtellum.
6513. sericeum.
6517. lanatum.

HIORAM, BRO., and MAUREL, C.

6035. hirsutum.

HODGE, W. H.

158. hirsutum.
159. hirsutum.
1412. latifrons.

HODGE, W. H., and HODGE, B. T.

2825. hirsutum.

HOEHNE, F. C.

752. microcarpum.

HOLDRIDGE, L. R.

1333. sericeum.

HOLTON, I. F.

72. fusugasugense.
73. microcarpum.

JACK, J. G.

8057. hirtellum.

JAHN, A.

1009. lindenii.

JAMESON, W.

12. valvatum.
68. plumieri.
73. plumieri.
82. trichophyllum.
109. microcarpum.
219. microcarpum.
235. plumieri.

JELSKI, C. DE

897. simplex.

JENMAN, G. S.

85. antillense.

JIMÉNEZ, O.

593. hemipteron.

JOHNSON, D. S.

1. microcarpum.
3. hirsutum.

JOHNSON, H.

151. microcarpum.
174. hirsutum.
361. lineare.
362. hirsutum.
363. sieberi.
368. pulchellum.
532. maxonii var. angustius.
534. microcarpum.
593. sieberi.
705. maxonii var. angustius.
706. pulchellum.
811. microcarpum.
813. fragile.
814. lineare.
817. maxonii var. angustius.
910. sieberi.
911. sieberi.
918. maxonii var. angustius.
922. lineare.
923. maxonii var. angustius.
926. microcarpum.
928. pulchellum.

JUERGENS, C.

135. crispum.
136. fragile.
137. pulchellum.
(Rosenst. 159). crispum.
(Rosenst. 255). crispum.

KANEHIRA, R.

123. pyramidatum.

KILLIP, E. P.

5048. microcarpum.
5064. plumosum.
5226. fragile.
5264. hemipteron.
5268. consanguineum.
5270. hemipteron.
5273. trichophyllum.
5280. hemipteron.
5282. fragile.
5283. fragile.
5340. elegans.
5395. fragile.
5397. microcarpum.
5399a. fragile.
5404 p. p. subrigidum.
5495. subrigidum.
6705. trichophyllum.
6720. trichophyllum.
7719. microcarpum.
7736. fragile.
11228. microcarpum.
11294. fragile.
11327. plumosum.
11347. lindenii.
11366. dependens.
11557. silvaticum.
12140. trichophyllum.
35267. microcarpum.

KILLIP, E. P., and GARCÍA, H.

33934. fragile.
35645. microcarpum.

KILLIP, E. P., and HAZEN, T. E.

9458. elegantulum.
9478. trichophyllum.
11141. microcarpum.
11148. microcarpum.

KILLIP, E. P., and SMITH, A. C.

15334 p. p. elegans.
15334 p. p. elegans f. minor.
15342. elegans.
15358. karstenianum.
16143. microcarpum.
17220. trapezoidale.
17787. ruizianum.
17839. trapezoidale.
18164. fusugasugense.
18773 p. p. trapezoidale.
19930. lindenii.
20660. trichophyllum.
24833. plumosum.
24840. plumosum.
24850. interruptum.
25733. plumosum.
25869. pyramidatum.
25899. interruptum.
25948. verecundum.
28539. hirsutum.

KLUG, G.

3248. lobato-alatum.

KNIGHT, W.

29268. pulchellum.
29271. pulchellum.
29373. subrigidum.

KOHAUT, F.

(Sieber 71). sieberi.

LANKESTER, C. H.

648. plumosum.
648b. pulchellum.
664. hemipteron.
708. subrigidum.
752. fragile
892. plumosum.

LECHLER, W.

2246. speciosum.
2498. valvatum.

LEHMANN, F. C.

124. valvatum.
125. plumieri.
652. trichophyllum.
1978. microcarpum.
1979. valvatum.
1983. fragile.
2210. microcarpum.
2442. trapezoidale.
2656. lindenii.
3055. microcarpum.
3128. lindenii.
4932. lindenii.
6392. lindenii.
6397. trichophyllum.
6398 p.p. multialatum.
6414. microcarpum.
7585. lobato-alatum.
7586. plumosum.
B. T. 745. microcarpum.

LEÓN, BRO.

11116. urbanii.

LEÓN, BRO., CLÉMENT, BRO., and ROCA, PRE.

10258. lanatum.
10502. hirsutum.

LEONARD, E. C.

4531. microcarpum.
4656. sericeum.

LEONARD, E. C., and LEONARD, G. M.

14501. hirsutum.
14577. hirsutum.
15161. hirsutum.

LINDEN, J. J.

173. lindenii.

LINDIG, A.

122. microcarpum.

LINDMAN, C. A. M.

(Regnell A487). pulchellum.

LUEDERWALT, H.

(Mus. Paulista 1539). pulchellum.

LUETZELBURG, P. VON

395. rufum.
6363. crispum.

7103. elegans.
7203. elegans.

LYONNET, E.

2858. trapezoidale.

MACBRIDE, J. F.

4516. ruizianum.
5146. plumosum.
5632. pyramidatum.

MAGUIRE, B.

24579. trapezoidale.

MATHEWS, A.

1090. pyramidatum.

MATUDA, E.

2908. elegantulum.

MAXON, W. R.

238. microcarpum.
496. elegans.
508. fragile.
519. fragile.
909. sericeum.
955. lanatum.
959. lanatum.
1063. sericeum.
1075. lanatum.
1081. hirsutum.
1220. fragile.
1227. lineare.
1233. microcarpum.
1256. fragile.
1297. lanatum.
1303. sericeum.
1383. urbanii.
1543. hirtellum.
1565. hirtellum.
1732. lanatum.
1915. hirtellum.
2247. hirtellum.
2430. hirtellum.
2433. hirtellum.
2666. urbanii.
2714. lanatum.
2719. urbanii.
2746. crispum.
2755. crispum.
2779. microcarpum.
5438. plumosum.
5447a. consanguineum.
5453. consanguineum.
5457. elegantulum.
5468. elegantulum.
5470. consanguineum.
5491. elegantulum.
5566. microcarpum.
5610. fragile.
5624. consanguineum.
5632. elegantulum.
5683. fragile.
5693. plumosum.
8845. hirtellum.
8856. hirtellum.
8943. lanatum.
8959. hirtellum.
9017. lanatum.
9018. hirsutum.
9021. lanatum.
9027a. lanatum.
9061. hirtellum.
9119. hirtellum.
9123. lanatum.
9188. hirsutum.
9197. lanatum.
9205. hirsutum.
9257. hirsutum.
9283. lanatum.
9422. lanatum.
9444. hirsutum.
9569. hirsutum.
9589. lanatum.
9644. sericeum.
9654. lanatum.
9707. crispum.
9716. sericeum.
9717. lanatum.
9720. crispum.
9725. hirsutum.
9726. lineare.
9729. sericeum.
9732. fragile.
9733. urbanii.
9742. lanatum.
9749. fragile.
9750. urbanii.
9820. crispum.
9840. crispum.
9877. urbanii.
10016. urbanii.
10028. lanatum.
10034. urbanii.
10139. lanatum.
10140. fragile.
10189. fragile.
10201. lanatum.

10250. fragile.
10252. lanatum.
10259. fragile.
10551. hirsutum.
10555. sericeum.
10579. hirsutum.
10583. hirtellum.

MAXON, W. R., and HARVEY, A. D.

7966. elegans.
7978. horizontale.
7979. sieberi.
8172. hemipteron.
8178. fragile.
8187. hemipteron.
8193. hemipteron.
8202. subrigidum.
8212. consanguineum.
8236. hemipteron.
8237. subrigidum.
8239. hemipteron.
8358. hemipteron.

MAXON, W. R., and HAY, R.

3212. hirsutum.
3326. maxonii.
3327. fragile.
3328. maxonii.
3329. elegans.
3334. lanatum.
3335. maxonii.

MAXON, W. R., and KILLIP, E. P.

177. hirtellum.
666. sericeum.
670. lanatum.
705. lanatum.
773. hirtellum.
777. hirtellum.
965. crispun.
1017. sericeum.
1172. lanatum.
1176. urbanii.

MAYOR, E.

73. elegantulum.

MEXIA, Y.

4051. plumosum.
4299. hirsutum.
6288a. hirsutum.
6926. lobato-alatum.
6928. microcarpum.
6931. microcarpum.

7021. hirsutum.
7297. lobato-alatum.
8143a. verecundum.
8145. hirsutum.
8258. lobato-alatum.
9277 p. p. hirsutum.
9277 p. p. trapezoidale.

MIERS, J.

250. fragile var. venustum.

MILLE, L.

120. trichophyllum.

MORITZ, J.

266. fragile.
266b. hirsutum.
269. microcarpum.
340. interruptum.
344 p. p. trichophyllum.
381 p. p. karstenianum.

MORTON, C. V., and ACUÑA, J.

3524. hirsutum.
3558. elegantulum.
3702. sericeum.
3706. microcarpum.
3708. elegans.
4500. sericeum.

MOSÉN, H.

(Regnell 3101). glaziovii.

MUENCH, G.

11. sieberi.

MUTIS, J. C.

3186. trapezoidale.
3189. elegantulum.
3193. trapezoidale.
3197. elegantulum.
3198. elegantulum.
3202. fusugasugense.
3203. fusugasugense.
3205. trichophyllum.
3207. microcarpum.
3208. fusugasugense.
3209. elegantulum.

NELSON, E. W.

3633. elegantulum.

D'ORBIGNY, C.

175. speciosum.
304. crispum.

ORCUTT, C. R.

5279. microcarpum.
5371. urbanii.
5585. lineare.

PENLAND, C. W., and SUMMERS, R. H.

882. trichophyllum.

PENNELL, F. W.

4391. dependens.
6989. trichophyllum.
9248. fusugasugense var. aberrans.
9399. fusugasugense var. aberrans.

PENNELL, F. W., and HAZEN, T. E.

9941. trichophyllum.
10080. trichophyllum.
10081. elegantulum.

PENNELL, F. W., and KILLIP, E. P.

5799. dependens.

PITTIER, H.

317. microcarpum.
337. sieberi.
1192. lindenii.
3552. hirsutum.
(Donn. Smith 7490). elegantulum.
(Herb. Nat. Cost. 10984). microcarpum.
(Herb. Nat. Cost. 12109). hirsutum.
(Herb. Nat. Cost. 13259*ter*). fragile.

POEPPIG, E. F.

1104. interruptum.

PRESTOE, H.

(Herb. Trinidad 1200). dependens.

PRINGLE, C. G.

5591. pulchellum.
6079. fragile.
8157. trapezoidale.
13255. fragile.

PURPUS, C. A.

152. pulchellum.
164. trapezoidale.
165. trapezoidale.
166. trapezoidale.
1985. trapezoidale.

QUESTEL, A.

1028. valvatum.
1044. hirsutum.
1102. lineare.
1790. lanatum.
1846. hirsutum.

REGNELL, A. F.

III. 1485. pulchellum.

RIEDEL, L.

34. pulchellum.
47. pulchellum.

RIMBACH, A.

12. superbum.
13. valvatum.
19. superbum.
19A. superbum.
77. valvatum.
78. microcarpum.

ROSE, J. N., and RUSSELL, P. G

20580. rufum.
20771. microcarpum.

RUIZ, H.

83. lobato-alatum.
85. ruizianum.

RUSBY, H. H.

135. interruptum.
137. microcarpum.
140. plumosum.
183. interruptum.

SAMPAIO, A. J.

2566. hirsutum.

SANTOS, J. V.

3351. trapezoidale.

SARGENT, F. H.

323. sieberi.
3144. elegantulum var. petiolulatum.

SCHLIM, L.

857. microcarpum.

SCHMALZ, A.

174. hirsutum.

SCHRAMM, E. E.

24. hirsutum.
34. hirsutum.
39. hirsutum.

SCHULTES, R. E.

5637. hirsutum.

SCHULTZE, A.

138. fusugasugense.

SCHUNKE, C.

183. interruptum.
463. microcarpum.
466. pyramidatum.
926. pyramidatum.
1491. microcarpum.
1559. microcarpum.
A241. pyramidatum.
A244. microcarpum.
A245. interruptum.

SCHWACKE, W.

11085. silveirae.
12528. silveirae.

SEIFRIZ, W.

329. hirsutum.

SHAFER, J. A.

767. hirsutum.
768. hirsutum.
774. hirsutum.
2329. microcarpum.
3312. microcarpum.
3355. microcarpum.
3894. sericeum.
8119. sericeum.
8130. lanatum.
8132. sericeum.
9030. hirsutum.

SILVEIRA, A.

2332. silveirae.

SINTENIS, P.

6353. hirsutum.

SKUTCH, A. F.

164. hirsutum.
286. elegantulum.
3559. fragile.
3639. microcarpum var. lanceolatum.
4461. microcarpum.

SMITH, H. H.

993. karstenianum.
1100. elegans f. minor.
2249. microcarpum.
2600. fragile.

SMITH, H. H. AND SMITH, G. W.

445. hirsutum.

SMITH, J. D.

1548 maxonii.
1549. pulchellum.

SMITH, L. B.

1760. rufum.

SNEIDERN, K. VON

563. dependens.

SPANNAGEL, C.

121. pulchellum.
123. crispum.
156. fragile.
317. elegans.
(Rosenst. 448). elegans.

SPRUCE, R.

2974. hirsutum.
4694. karstenianum.
4702. tenerrimum.
5421. ruizianum.

STANDLEY, P. C.

32902. elegans.
33044. hemipteron.
33139. lineare.
33639. microcarpum.
33646. elegans.
34418. fragile.
35189. elegans.
35403. crispum.
35535. fragile.
35659. subrigidum.
35667. fragile.
36350. horizontale.
38114. horizontale.
38115. plumosum.
38447. trichophyllum.
38733. trichophyllum.
38811. elegantulum var. petiolulatum.
38830. crispum.
39388. plumosum.
39609. horizontale.
39653. plumosum.
39692. microcarpum.
39744. microcarpum

39750. microcarpum.
39864. plumosum.
39875. microcarpum.
39881. microcarpum.
66242. crispum.
71622. sieberi.
71661. microcarpum.

STANDLEY, P. C., and TORRES, R.

51062. fragile.
51360. fragile.

STANDLEY, P. C., and VALERIO, J.

51525. trichophyllum.
52270. subrigidum.

STEHLÉ, H.

1222. hirsutum.
1778. lineare.
2052. valvatum.
2248. valvatum.
3405. valvatum.
3446. sieberi.
5380. hirsutum.

STEINBACH, J.

8373bis. interruptum.
8895. verecundum.
9141. interruptum.
9142. verecundum.
9260. ruizianum.

STEVENSON, J. A.

1552. microcarpum.

STEWART, A.

898. hirsutum.

STEYERMARK, J. A.

30787. maxonii.
31568. hirsutum.
35436. pulchellum.
36060. crispum.
36444. crispum.
36710. pulchellum.
36780. crispum.
37128. pulchellum.
39378. hirsutum.

STORK, H. E.

1176. fragile.

STOUDT, H. N.

800. urbanii.

STUEBEL, A.

43. trichophyllum.
237. trichophyllum.
336. trichophyllum.
813. trichophyllum.

TATE, G. H. H.

331. trichophyllum.
453. trichophyllum.
499. microcarpum.
852. karstenianum.
1053. pyramidatum.
1061. microcarpum.

THOMPSON, S. A.

17. hirsutum.

THURN, E. F., IM

200. antillense.
203. roraimense.
206. microcarpum.
371. microcarpum.
375. roraimense.

TOMÁS, BRO.

415. fusugasugense.

TONDUZ, A.

(Herb. Nat. Cost. 10141). plumosum.
(Herb. Nat. Cost. 13341). microcarpum.

TORRES R., R.

6. elegantulum var. petiolulatum.
94. microcarpum.
117. fragile.
192. fragile.
193. elegans.
204. subrigidum.

TRELEASE, W.

21. lanatum.

TRIANA, J.

199. lindenii.
206. fusugasugense.

TUERCKHEIM, H. VON

12. pulchellum.
12a. sieberi.
647 p. p. sieberi.
647 p. p. maxonii var. angustius.
650. microcarpum.
951. fragile.

II. 1569. pulchellum.
II. 1847. hirsutum.
II. 1849. hirsutum.
II. 1851. hirsutum.
II. 1936. pulchellum.
II. 1938. lanatum.
II. 1984. microcarpum.
II. 1985. microcarpum.
II. 1986. sieberi.
II. 2081. sieberi.
(Donn. Smith 8031). hirsutum.
(Donn. Smith 8805). hirsutum.

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ULE, E.

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1474. urbanii.

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A9. plumosum.
A11. fragile.
III. 40. horizontale.

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VARGAS, C.

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3295. ruizianum.

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(Rosenst. 65). microcarpum.
(Rosenst. 175). pulchellum.
(Rosenst. 176). pulchellum.
(Rosenst. 327). hirsutum.

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188bis. lanatum.

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574. sieberi.
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220. microcarpum.
233. microcarpum.
339. maxonii var. angustius.

WILSON, N.

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WILSON, P.

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WOODSON, R. E., Jr., and SCHERY, R. W.

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FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 29, PART 4

THE AWNLESS ANNUAL SPECIES OF MUHLENBERGIA

By JASON R. SWALLEN

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THE AWNLESS ANNUAL SPECIES OF MUHLENBERGIA

By JASON R. SWALLEN

IT SOMETIMES happens that essential characters used to separate genera and species remain overlooked for many years. It is evident that this has occurred with the dropseed, *Sporobolus microspermus*, of recent floras and manuals. This species has been considered as rather complex, made up of forms that could not be satisfactorily separated. In a recent study, however, it became apparent that there were four forms of this grass that could be distinguished rather arbitrarily merely on their appearance. On the assumption that there should be definite characters as well, a search was made for them with the result that four well-defined species were segregated, two of which have not been described. The other two are the true *S. microspermus* (Lag.) Hitchc., which is not known from the United States, and *S. minutissimus* (Steud.) Hitchc., the latter having been referred to *S. microspermus* as a synonym.

The lemmas of all the species of this group are 3-nerved and relatively firm, and the caryopses are slender, cylindrical or somewhat dorsally compressed, and usually do not readily fall from the floret. These are characters of *Muhlenbergia*. In *Sporobolus* the lemmas are only 1-nerved, and the caryopses are obovate, usually strongly laterally compressed, and readily drop from the floret. The fact that the lemmas are awnless and the nerves are sometimes not easily seen without a relatively strong lens is probably responsible for their having been retained in *Sporobolus*.

In addition to the species segregated from "*Sporobolus microspermus*," there are four others previously referred to *Sporobolus* that also clearly belong in *Muhlenbergia*. These are *S. annuus* Vasey, *S. shepherdi* Vasey, *S. ramulosus* (H. B. K.) Kunth, and *S. wolfii* Vasey. The last one, described from Twin Lakes, Colo., has been referred to *S. ramulosus* as a synonym. True *S. ramulosus*, described from Mexico, has not been found in the United States.

KEY TO THE SPECIES

Glumes longer than floret, acuminate.. ---------- 1. **M. annua**
Glumes shorter than floret, or, if as long as floret, obtuse.
  Pedicels capillary, very flexuous; anthers 1–1.4 mm. long.
    Glumes glabrous, as long as or a little shorter than floret. 2. **M. shepherdi**
    Glumes long-pilose, usually about half as long as floret.. 3. **M. sinuosa**

Pedicels thicker, if filiform, straight and rather stiff; anthers 0.2–0.5 mm. long.
Pedicels relatively stout, at least lateral ones shorter than spikelets; anthers 0.2 mm. long.
Pedicels stiffly and abruptly spreading, at least at maturity; lemma 0.8–0.9 mm. long, glabrous or nearly so; glumes less than half as long as spikelet; caryopsis about 0.5 mm. long_ 4. **M. ramulosa**
Pedicels appressed; lemma 1–1.2 mm. long, rather densely pubescent on margins; glumes half or slightly more than half as long as spikelet; caryopsis 0.8–1 mm. long_____ 5. **M. wolfii**
Pedicels filiform or capillary, elongate, at least much longer than spikelets.
Panicles very diffuse, 4–10 cm. wide, the branches spreading or even reflexed; glumes glabrous; spikelets 1–1.1 mm. long_6. **M. fragilis**
Panicles narrower, or, if as much as 4 cm. wide, the branches ascending; glumes pilose, at least at tip.
Spikelets 0.8–1 mm. long; glumes obtuse, half as long as floret, glabrous on back, sparsely pilose at tip; lemma glabrous. 7. **M. confusa**
Spikelets 1.2–1.5 mm. long; glumes, at least some of them, acute, sparsely to densely short-pilose at least toward summit; lemma densely short-pubescent along keel and on margins_____ 8. **M. minutissima**

1. **Muhlenbergia annua** (Vasey) Swallen, comb. nov.
Sporobolus annuus Vasey, Bull. Torrey Club **14**: 9. 1887.

Known only from the type collection from Noragachi, Chihuahua, Mexico, *Palmer* 4a in 1885.

2. **Muhlenbergia shepherdi** (Vasey) Swallen, comb. nov.
Sporobolus shepherdi Vasey, Bull. Torrey Club **14**: 8. 1887.

The lemmas are pilose across the back, but the hairs are so fine and closely appressed that they are not easily seen. In most of the specimens the spikelets seem to have stamens only.

Distribution.—Borders of arroyos, rocky cliffs, and pine woods, Chihuahua and Durango, Mexico.

Representative specimens.—CHIHUAHUA: Colonia García, *Lamson-Scribner* 330; Sierra Madre, *Pringle* 1424. DURANGO: Sandi Station, *Pringle* 13635.

3. **Muhlenbergia sinuosa** Swallen, sp. nov.
? *Sporobolus confusus* var. *aberrans* Jones, Contr. West. Bot. **14**: 10. 1912. The type matches the specimens referred to *M. sinuosa*, except that the spikelets have caryopses and small stamens.

Annua; culmi 15–50 cm. alti, geniculati, adscendentes, ramosi, infra nodos strigosi; vaginae internodiis longiores; ligula hyalina, 2–3 mm. longa, lacerata; laminae planae ad 1.5 mm. latae, minute pubescentes; paniculae 14–22 cm. longae, 2–6 cm. latae, ramis adscendentibus; pedicelli elongati capillares, sinuosi; spiculae 1.5–2 mm. longae; glumae obtusae, pilosae, spicula duplo breviores; lemma obtusum in carina et marginibus dense pubescens; palea obtusa, sparse pilosa; antherae 1–1.2 mm. longae.

Annual; culms in dense tufts, 15–50 cm. high, geniculate-ascending, branching at the nodes, strigose below the nodes, otherwise glabrous; sheaths longer than the internodes; ligule hyaline, 2–3 mm. long, lacerate; blades flat, 1–1.5 mm. wide, minutely pubescent on both surfaces, with thickened white midnerve and margins; panicles 14–22 cm. long, 2–6 cm. wide, the scabrous branches ascending; pedicels elongate, capillary, sinuate; spikelets 1.5–2 mm. long; glumes obtuse, about half as long as the spikelet, usually conspicuously pilose, especially near the margins; lemma obtuse, densely silky-pubescent below on the midnerve and margins; palea as long as the lemma, broad, obtuse, sparsely pilose on and between the nerves; stamens 1–1.2 mm. long.

Type in the U. S. National Herbarium, No. 234817, collected on the west side of the San Luis Mountains, Grant County, N. Mex., September 26, 1893, by Edgar A. Mearns (No. 2457).

Distribution.—Canyon walls and borders of marshes, New Mexico and Arizona.

Representative specimens.—NEW MEXICO: Mangas, *J. G. Smith* in 1896; Hillsboro, Sierra County, *Metcalfe* 1368; Organ Mountains, *Wooton* 2020; Datil Forest, *Forest Service* 50699; Gila Forest, *Forest Service* 23723, 36188, 36239. ARIZONA: Santa Rita Mountains, *Griffiths & Thornber* 39, *Griffiths* 7243; White Mountains, *Griffiths* 5436; Rincon Mountains, *Neally* 173; Fort Huachuca, *Wilcox* 436; Coconino Forest, *Forest Service* 9272, 41541; Santa Rita Range Reserve, *Forest Service* 45281.

4. **Muhlenbergia ramulosa** (H. B. K.) Swallen, comb. nov.
   Vilfa ramulosa H. B. K. Nov. Gen. & Sp. **1:** 137. 1815.
   Sporobolus ramulosus Kunth, Rév. Gram. **1:** 68. 1829.

Distribution.—Woods, open ground, and sandy soil, 8,000–11,000 feet, Mexico to Costa Rica.

Representative specimens.—MORELOS: Tres Marías, *Pringle* 10412. MEXICO: Temascaltepec, *Hinton* 2311, 2318, 2437, 5073; Cima, *Rose & Painter* 8062. GUATEMALA: Santa María, Volcán Agua, *Hitchcock* 9125. COSTA RICA: Volcán Irazú, *Jiménez* 1151.

5. **Muhlenbergia wolfii** (Vasey) Rydb. Bull. Torrey Club **32:** 600. 1905.
   Vilfa minima Vasey, U. S. Dept. Agr. Monthly Rep. **1874:** 155. 1874. Not *V. minima* Trin. ex Steud. 1854.
   Sporobolus wolfii Vasey, Bull. Torrey Club **10:** 52. 1883.
   Sporobolus racemosus Vasey, Bull. Torrey Club **14:** 9. 1887.

Distribution.—Borders of marshes, pinelands, dry sandy or rocky soil, and cinder slopes, Colorado, New Mexico, Arizona, and Chihuahua.

COLORADO: Clyde, *Silveus* in 1935. NEW MEXICO: Grant County, *Rusby* 440; Santa Fe Forest, *Forest Service* 38763. ARIZONA: Rincon Mountains, *Bloomer* 3365; Santa Catalina Mountains, *Griffiths* 7112;

San Francisco Peak, *Leiberg* 5962; Apache Forest, *Forest Service* 16103. CHIHUAHUA: Sánchez, *Hitchcock* 7661; Sierre Madre, *Pringle* 1425.

6. **Muhlenbergia fragilis** Swallen, sp. nov.

Annua; culmi erecti vel adscendentes, 10–30 cm. alti, ramosi, infra nodos strigosi; vaginae internodiis longiores, scaberulae, marginibus hyalinis; ligula 1–3 mm. longa, hyalina, decurrens; laminae usque ad 6 cm. longae, 1.5 mm. latae, scaberulae; paniculae 10–20 cm. longae, 4–10 cm. latae, ramis gracilibus patentibus vel reflexis; pedicelli capillares recti divergentes, 2–10 mm. longi; spiculae 1–1.1 mm. longae; glumae obtusae vel subacutae, glabrae, spicula 1/2–1/4 breviores; lemma obtusum, glabrum vel in carina et marginibus dense sericeum; palea obtusa in nervis minute pilosa; antherae ca. 0.4 mm. longae.

Annual; culms erect or geniculate ascending, 10–30 cm. high, freely branching at the lower nodes, strigose below the nodes, otherwise glabrous; sheaths longer than the internodes, scaberulous, with thin hyaline margins; ligule 1–3 mm. long, thin, hyaline, decurrent; blades as much as 6 cm. long, 1.5 mm. wide, scaberulous, with prominent, white, thickened midnerve and margins; panicles very diffuse, more than half the length of the culm, 4–10 cm. wide, the numerous usually solitary slender branches becoming stiffly spreading or even reflexed, with a pulvinus in the axils, the branchlets divergent; pedicels capillary but usually straight, divergent, mostly 2–5 mm., or sometimes as much as 10 mm. long; spikelets 1–1.1 mm. long; glumes half to three-fourths as long as the spikelet, obtuse or subacute, glabrous; lemma obtuse, glabrous or densely silky-pubescent on the keel and margins; palea as long as the lemma, sparsely and minutely pilose on the nerves; anthers about 0.4 mm. long; caryopsis elliptic, 0.7 mm. long, somewhat dorsally compressed, reddish brown.

Type in the U. S. National Herbarium, No. 1829290, collected at Sunny Glen, west of Alpine, Brewster County, Tex., September 29, 1935, by Barton H. Warnock (No. 235).

Distribution.—Moist sandy soil and rocky hills, western Texas, New Mexico, Arizona, south to central Mexico.

Representative specimens.—TEXAS: Presidio County, *Nealley* 145; Mount Livermore, *Hinckley* 526. NEW MEXICO: Dona Ana County, *Hitchcock* 3788; Animas Valley, *Mearns* 2490. ARIZONA: Santa Rita Mountains, *Silveus* 3467; Santa Cruz County, *Hitchcock* 3686, 3788; Prescott, *Griffiths* 7342; Santa Catalina Mountains, *Kearney & Peebles* 10347; Tonto Forest, *Forest Service* 87357; Coronado Forest, *Forest Service* 41684, 49616; Coconino Forest, *Forest Service* 9260. SONORA: Nogales, *Wiggins* 6224; Cucurpe, *Wiggins* 7163. CHIHUAHUA: Southwestern Chihuahua, *Palmer* 76; Chihuahua, *Hitch-*

cock 7783, *Pringle* 482. COAHUILA: San Antonio de los Alamos, *I. M. Johnston* 8244; Aribabi, *Harvey* 1658. AGUASCALIENTES: Aguascalientes, *Hitchcock* 7472. MORELOS: Xochitepec, *Lyonnet* 2613.

In some of the specimens the lemmas are entirely glabrous, while in the rest they are densely pubescent on the keel and margins. The nerves of the lemma are faint but quite evident under a lens.

7. **Muhlenbergia confusa** (Fourn.) Swallen, comb. nov.
   Milium microspermum Lag. Gen. & Sp. Nov. 2. 1816. Not *Muhlenbergia microsperma* Kunth, 1829.
   Vilfa confusa Fourn. Mex. Pl. **2:** 101. 1886.
   Sporobolus confuses Vasey, Bull. Torrey Club **15: 293.** 1888.
   Sporobolus microspermus Hitchc. Journ. Washington Acad. Sci. **23:** 453. 1933.

Culms very slender, delicate, mostly 8–20 cm. high; spikelets 0.8–1 mm. long with obtuse or subacute glumes half as long as the spikelet, glabrous on the back, sparsely ciliate on the margins at the tip; lemmas glabrous.

Distribution.—Woods and stream banks, Mexico and Guatemala.

Representative specimens.—PUEBLO: Pueblo, *Arsène* 48. MÉXICO: Salto de Agua, *Purpus* 1635, *Pringle* 13998, *Schaffner* 192. GUATEMALA: Quiché, *Archer* 3858; Volcán Agua, *Hitchcock* 9130.

8. **Muhlenbergia minutissima** (Steud.) Swallen, comb. nov.
   Agrostis minutissima Steud. Syn. Pl. Glum. **1:** 171. 1854.
   Sporobolus minutissimus Hitchc. Proc. Biol. Soc. Washington **41:** 161. 1928.

Differs from *M. confusa* in having spikelets 1.2–1.5 mm. long, the glumes pilose on the back, two-thirds as long as the spikelet, at least some of them acute, and lemma pubescent along the midnerve and on the margins below.

Distribution.—Moist sandy or rocky soil, along streams and in meadows and open woods, Montana to Washington south to northern Mexico.

Representative specimens.—TEXAS: Davis Mountains, Jeff Davis County, *Palmer* 30736, 32017. MONTANA: Melrose, *Rydberg* 2291. WYOMING: Torrington, Laramie County, *Nelson* 8286; Laramie River, Albany County, *Nelson* 446. IDAHO: St. Anthony, *Merrill & Wilcox* 434. WASHINGTON: Parker Bottom, Yakima County, *Elmer* 1076. OREGON: Elgin, *Shear* 1740. COLORADO: Alamosa, Conejos County, *Shear* 868; Gunnison, Gunnison County, *Clements* 245; Pike Forest, *Forest Service* 58172, 88276; Rio Grande Forest, *Forest Service* 89313. NEVADA: Truckee River bottom, *Watson* 1278. NEW MEXICO: Carson Forest, *Forest Service* 36863, 39124; Datil Forest, *Forest Service* 23811, 23839, 41767; Lincoln Forest, *Forest Service* 41558. ARIZONA: Santa Catalina Mountains, *Shreve* 5391; Flagstaff, *Hitchcock* 13211; *Silveus* 3348; Coconino Forest, *Forest Service* 39494, 74981; Apache Forest, *Forest Service* 16090, 16104; Sitgreaves Forest, *Forest Service*

19054. CALIFORNIA: Mono Lake, *Bolander* 6096; Yosemite Valley, *Abrams* 4669. CHIHUAHUA: Miñaca, *Hitchcock* 7767, *Pennell* 18981. DURANGO: El Salto, *Pennell* 18517. JALISCO: La Junta, Orcutt 5472; Guadalajara, *Hitchcock* 7276, 7309. MICHOACÁN: Coalcomán, *Hinton* 15340.

Typically, the lemma is quite awnless, but occasionally there is a very short awn or mucro, indicating a relationship with *M. texana* and a transition from the awnless to the awned species of *Muhlenbergia*.

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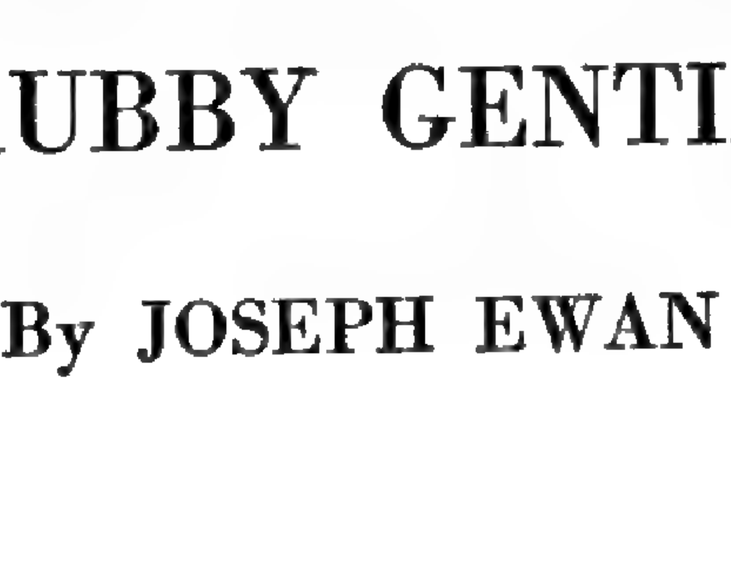
FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 29, PART 5

A REVISION OF MACROCARPAEA A NEOTROPICAL GENUS OF SHRUBBY GENTIANS

By JOSEPH EWAN



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PREFACE

The accompanying paper by Joseph Ewan, of the Department of Botany of Tulane University of Louisiana, presents a revision of *Macrocarpaea*, a genus of shrubby gentians occurring in the American Tropics. These studies were carried out in greater part while Mr. Ewan was a member of the staff of the Smithsonian Institution.

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A REVISION OF MACROCARPAEA, A NEOTROPICAL GENUS OF SHRUBBY GENTIANS

By Joseph Ewan

INTRODUCTION

The genus *Macrocarpaea* as now defined constitutes a group of 30 shrubby gentians confined to tropical America. These have no relatives among the alliances of the gentian family in temperate North America, and by one first visiting the mountain rain forests of the Andes they are not recognized at once as gentians. In the first place, slender "trunked" shrubs of this genus may reach a height of 2 to 4 or 6 meters! Again, the flowers are borne mostly on long peduncles in open panicles or at times in crowded clusters and vary from pale greenish to golden-yellow, now recalling those of foxglove or *Penstemon*, now those of that other Andean genus of ornamental shrubs grown in the open in subtropical United States, *Iochroma* of the Solanaceae. Originally described as species of the polymorphous genus *Lisianthus* somewhat over a century ago, the total number of collections available for study of all species is very limited and many are still known only from the single original type collection. Nevertheless, our knowledge of this genus has grown with the extended exploration of Central and South America. Every botanical collector who visits remote or hitherto unvisited regions returns with some novel material, and so the number of recognized species has doubled in the last quarter century. No systematic account of *Macrocarpaea*, or any partial treatment of the group, exists. The several species described by the German botanist Ernst Gilg, and by Charlotte Gilg, were published without a key to the species or a résumé of affinities. My treatment is an attempt to present a synopsis of the genus as a whole.

HISTORICAL NOTE

When, in 1839, A. H. R. Grisebach, physician and Privat Docent at the University of Göttingen, wrote a monograph of the Gentianaceae he placed [1] the group of plants now known as the genus *Macrocarpaea* in the genus *Lisianthus*,[2] creating at that time a section *Macrocarpaea*

[1] Gen. Sp. Gent. 173. 1839.

[2] Grisebach therein spelled *Lisianthus* "*Lisyanthus*," following Aublet (1775) in this, but Linnaeus had priorly established the genus (1767) in the orthographic form generally accepted; Grisebach himself later (1845) took it up.

to receive them. This section included eight species, viz, *Lisianthus glaber*, which may be taken as the type of the genus *Macrocarpaea*, and *L. revolutus*, *L. macrophyllus*, *L. obtusifolius*, *L. viscosus*, *L. daturoides*, *L. frigidus*, and *L. ovalis*.[3] Grisebach characterized this section as comprising for the most part plants with large leaves (when compared with other herbaceous species of the alliance of *L. longifolius* L.), a dichotomous inflorescence of erect flowers, a broadly cylindric corolla tube but with the lobes relatively short and regular, and a biloculate capsule with the placenta free from the septum. His sectional treatment of the genus *Lisianthus*, which appeared six years later,[4] followed his first account without important alterations. Six of Grisebach's eight species of his section *Macrocarpaea* are placed in that genus today, *Lisianthus daturoides* having been transferred by Gilg to *Symbolanthus*, and *L. frigidus* to *Calolisianthus*. Thus, the limits of the section *Macrocarpaea* as Grisebach conceived them were accepted without substantial change by Gilg when he established the genus in 1895.[5]

At the time Gilg established the genus he restricted the application of the name *Lisianthus glaber* L. f. to the plants of Peru and Bolivia, though that name rests upon a Mutis collection most assuredly originating in Colombia. *Macrocarpaea glabra* (L. f.) Gilg, as I interpret that species, is a rather common plant of the mountain slopes above Bogotá, which would have been easily accessible to Mutis at the time of his residence in that city. Gilg renamed this Colombian species *Macrocarpaea bogotana* in 1895 on the basis of his misapplication of the old *Lisianthus* name. *Macrocarpaea glabra*, on the other hand, is not known from Peru or Bolivia. The exact identity of the Peruvian and Bolivian collections so referred by Gilg cannot be ascertained at present owing to the destruction of the Berlin Herbarium. In 1895 Gilg published[6] eight other additions to *Macrocarpaea*, each based on a single collection in the Berlin Herbarium. Subsequently he described an Ecuadorian species,[7] followed by two Peruvian species,[8] and a supposedly new Colombian one.[9] It is fortunate that isotypes of some of these proposed species have been preserved in other herbaria, along with the invaluable photographs taken under the auspices of the Field Museum of Natural History (now Chicago Natural History Museum).

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[3] Grisebach added a ninth species, *L. mathewsii*, in the Addendum to his Gen. Sp. Gent. 361. 1839, but this has been referred to *Symbolanthus* by Gilg.

[4] DC. Prodr. 9: 77–78. 1845.

[5] Engl. & Prantl, Pflanzenfam. 4 (2) : 94. 1895.

[6] Bot. Jahrb. Engler 22: 337. 1895.

[7] Bot. Jahrb. Engler 25: 724. 1898.

[8] Repert. Nov. Sp. Fedde 2: 53–54. 1906.

[9] Jahrb. Engler Bot. 50: Beiblatt 50. 1913.

GEOGRAPHIC DISTRIBUTION

Macrocarpaea demonstrates a pattern of distribution in tropical America that is becoming increasingly familiar to students of plant geography. With a primary concentration of species in the northern Andes of South America, the genus has tenuously reached as far north in Central America as the mountains of Costa Rica (two species), as far south as Peru and Bolivia about the affluences of the Amazon, and as far east as the isolated sedimentary plateaulike mountains of Venezuela dominated by Roraima. Outlying species occupy only certain islands of the West Indies, and a distinctive species-group, the well-marked subgenus *Paranagenes*, is endemic to the mountains of southeastern Brazil. In its Andean pattern *Macrocarpaea* approximates closely that of the related genus *Symbolanthus* as well as *Cinchona* and several other characteristic Andean genera. Based on the criterion of the greatest concentration of both species and individuals, aside from the vagaries of exploration, the genus shows an Andean origin, precisely in the complex mountain region roughly designated geographically as the "Nodus" or the "Knot." This is the dissected terrain created by the perplexing pattern of the catchment basins of the Cauca, Patía, Putumayo, San Juan, Napo, and Pastaza Rivers of southern Colombia and northern Ecuador. Examining the evidence again, this time from the standpoint of the relict species which occupy the isolated plateau-mountains of Venezuela and Trinidad, one concludes that the genus may have had a more easterly origin, with the endemic species of these mountains representing the remnants of possible generic prototypes. These species of Venezuela and Trinidad are unlike the majority in the genus in their characteristic, small, sessile leaves, without prominent lateral nerves. The species most resembling these eastern species, *Macrocarpaea ovalis*, grows at nearly the other end of the Andean range of the genus in Peru and southern Ecuador. Again, it may be noticed that the endemic species of Venezuela and Trinidad often demonstrate transitional characters toward the morphology of the genera *Symbolanthus* and *Calolisianthus*. *Caliolisianthus frigidus* of the Lesser Antilles, displaying some characters of *Macrocarpaea*, should perhaps be considered in this connection. In short, possibly these relict endemics are the phylogenetically oldest species of *Macrocarpaea*.

Two endemic species of *Macrocarpaea* of Venezuela, *M. cerronis*, of Sororopán-tepuí, and *M. salicifolia*, of the mesa between Sororopán-tepuí and Ptari-tepuí, both of which are not known from Roraima or Duida, have their closest relative on Mount Tucuche, Trinidad. An almost equally close relative is *M. subcaudata* of Costa Rica. *Macrocarpaea bracteata*, another remarkable endemic of Venezuela, is nearly unique in the genus for its peculiar leafy bracts; in its vegetative

characters it is approached by the Brazilian *M. obtusifolia*. *Macrocarpaea valerii*, of Costa Rica, is most closely related to *M. macrophylla* of Colombia.

Each of the Colombian species of *Macrocarpaea* occupies a discrete geographic province within that country. Thus, *Macrocarpaea glabra* is confined to the Bogotá region; *M. polyantha*, to the páramos of Norte de Santander; *M. macrophylla*, the Central and Western Cordilleras; *M. pachyphylla*, the Eastern Cordillera of the southern departments; *M. ovalis* and *M. duquei*, the Western Cordillera of the southern departments; and *M. calophylla*, the Sierra Nevada de Santa Marta.

GENERIC RELATIONSHIPS

Gilg's fundamental taxonomy of the genera of Gentianaceae is based solely on the characters of the pollen grain. Though of value as a criterion to be taken along with other morphological characters, it is unfortunate to group together arbitrarily on this basis alone plants which manifest several unlike characters. Sometimes further study of a plant group, originally distinguished solely on the basis of pollen-grain characters, will provide other morphological *differentiae* of a fundamental nature. This is the situation in Gilg's genus *Rusbyanthus*. This Bolivian genus is closely related to *Macrocarpaea*, and though Gilg places it next to that genus in his treatment of the family, he creates a distinct subdivision for it, resting it on the supposedly diagnostic characters of the pollen. The only other distinction which Gilg provides for *Rusbyanthus* in his key to the genera of Gentianaceae is that of the placental attachment in relation to the ovary wall. There can be small doubt of the relationship of *Rusbyanthus* to *Macrocarpaea*, however, and the two genera may be distinguished as follows:

Calyx-lobes distinctly unequal, the alternate members shorter, narrower (about two-thirds as broad); corolla very showy, 45–60 (commonly 55–60) mm. long; capsule berrylike, with a thin cartilaginous wall, rupturing irregularly; seeds large, 3–4 mm. long, lunate-reniform, the coat alveolate. **Rusbyanthus**

Calyx-lobes essentially equal; corolla more or less showy but seldom as much as 55 mm. long (except in *M. duquei*); capsule generally with a thick, almost woody wall, dehiscent longitudinally into more or less regular valves; seeds relatively small or even minute, less than 2 mm. long_____ **Macrocarpaea**

An instance of the placing of unrelated genera together in a subdivision of the Gentianaceae is shown by Gilg's association of the genus *Symbolathus*, which surely must be related to *Macrocarpaea*, with *Chelonanthus*, *Lagenanthus*, etc., of the Gentianoideae-Helieae, rather than with the Gentianoideae-Gentianeae-Tachiinae, where *Macrocarpaea* is to be found. Here pollen characters were relied upon exclusively in the recognition of natural groups within the

Gentianaceae, with the consequent obscuring of other alliances within the family. *Symbolanthus*, another genus of woody gentians confined to the Andes, closely resembles *Macrocarpaea* in its leaf and flower characters and some species referred to it now may be of uncertain disposition in either genus. In general, however, the two genera may be distinguished as follows:

Corolla zygomorphic or subzygomorphic, the lobes acuminate or sharply acute, spreading, the lower lobes decurved or reflexed (sometimes strongly so); capsule almost baccate, often pleasantly sweet-aromatic, sphaeroidal or broadly oblong, filling the strongly accrescent calyx---------- **Symbolanthus**

Corolla actinomorphic or nearly so, the lobes blunt, rounded or simply acute, all erect; capsule almost woody to papery-chartaceous, never actually fleshy, with a soft pulpy wall, usually narrowly acuminate, the fruiting calyx moderately, if at all, accrescent, free from the capsule---------- **Macrocarpaea**

A fuller discussion of the relationships of *Macrocarpaea* to *Symbolanthus*, *Calolisianthus*, and related genera must await systematic studies of those groups.

GENERAL MORPHOLOGY AND DESCRIPTIVE TERMINOLOGY

Leaf.—The leaf blade of *Macrocarpaea* is sometimes thick and coriaceous, generally with a firm, rimlike, almost cartilaginous margin, which is described in this treatment as revolute-margined. These species constitute the section Magnoliifoliae. The remaining species (*M. rubra* and section Tabacifoliae) have distinctly membranous to simply firm but not coriaceous blades, lacking the revolute margin. They are at times quite thin and very fragile on withering or drying. The blades vary from smooth, that is, without roughness or pubescence of any kind, the usual condition, to punctate or weakly pubescent. Pubescence in this genus is usually a mere puberulence, less often hirtellous especially along the midrib. Rarely the blades are microlepidote beneath, that is, roughened with a pavementlike covering of minute scales. When a leaf-blade is glabrous both above and beneath it is described as amphiglabrous, a term introduced in my studies of *Delphinium* (Univ. Colorado Stud. ser. D. **2**: 78. 1945.) All leaf measurements are exclusive of the petiole.

Flower.—The flower of *Macrocarpaea* is typically campanulate, varying from narrow- to open-campanulate or less often salverform. Commonly the corolla is more or less abruptly ventricose above the calyx. A very few species display noncampanulate corollas; these comprise cylindric long-tubed and short-tubed almost included corolla forms.

Capsule.—The fruit is the most conservative organ of the plant in this genus, being almost uniformly elongate-fusiform to short-ovoid, and even this variation may prove to be largely developmental when additional collections are available for study. Mature capsules of

very few species are represented among the collections studied. All measurements are exclusive of the usually more or less persistent style, which in some species hardens to form a rather stout beak at maturity of the capsule.

MATERIAL STUDIED AND ACKNOWLEDGMENTS

Material has been available for this study from the Arnold Arboretum of Harvard University (A), Instituto de Ciencias Naturales, Bogotá (COL), Chicago Natural History Museum (F), Gray Herbarium of Harvard University (GH), Missouri Botanical Garden (MO), New York Botanical Garden (NY), Academy of Natural Sciences of Philadelphia (PH), U. S. National Herbarium (US), and the U. S. National Arboretum (USNA), the abbreviations indicated above being used in this paper for the place of deposit of the collection. I am grateful to the curators of these institutions for their cooperation in making available to me this material for study. Special thanks are due E. P. Killip, who has furthered this revision in many ways. Dr. S. F. Blake has kindly made suggestions for the improvement of the paper.

SYSTEMATIC TREATMENT

Genus MACROCARPAEA (Griseb.) Gilg

Lisianthus sect. *Macrocarpaea* Griseb. Gen. Sp. Gent. 173. 1839.
Macrocarpaea Gilg, Engl. & Prantl, Pflanzenfam. 4 (2) : 94. 1895.

Shrubs (rarely low herbaceous perennials) with mostly quadrangular or terete, or compressed, often grooved stems, the internodes sometimes very short; leaf blades usually ovate or oval, less often obovate or lanceolate, the apex acute or cuspidate, acute or cuneate at base, petiolate to subsessile, thick-coriaceous to thin-membranous, always entire; flowers borne in open, cymose, more or less bracteate panicles or rarely simply in racemes or few-flowered clusters; calyx-tube short-campanulate to subcylindric, the lobes 5, subequal, more or less ovate, overlapping or less often valvate; corolla narrow campanulate or salverform to open campanulate or rarely long-tubular, the lobes 5, subequal or two somewhat larger, generally ovate or oblong-ovate, acute or rounded; stamens 5, attached to corolla tube most often medianly, usually included, occasionally exserted; ovary ovoid or pyriform, 2-carpellate, each carpel maturing so as to suggest a leaf-blade ovuliferous over the whole upper surface, the blades inrolled to form a pair of tight coils ovuliferous to edges; style elongate, stigma bilobed, often deeply so, rarely capitate; mature capsule short-ovoid to elongate-fusiform, nearly woody to cartilaginous or chartaceous, wholly free from the persistent rather woody cupulate calyx, dehiscent longitudin-

ally into two more or less regular valves or carpels, each carpel with a false incomplete partition between the two inrolled coiled portions of the carpel; seeds very numerous, minute, quadrate or nearly so, usually yellowish or pale brown. Type: *Macrocarpaea glabra* (L. f.) Gilg.

KEY TO THE SUBGENERA

Low herbaceous perennials about 1 m. high; corolla reddish; sepals unlike, 3 obovate, rounded, thin, golden-translucent, the alternate 2 ovate, acute, opaque-green, the calyx-tube sulcate below the sinuses_____ I. PARANAGENES

Tall woody perennials generally 1–3 m. high or more; corolla yellowish or greenish; sepals essentially alike, the calyx-tube not sulcate below the sinuses_____ II. EUMACROCARPAEA

PARANAGENES Ewan, subg. nov.

Perennes nanae, caulibus simplicibus brevibus quadrangularibus herbaceis; corolla rubra; calycis lobis dimorphis, tribus obovatis, obtusis, membranaceis, aureo-translucentibus, duobus alternis ovatis, acutis, viridi-opacis, tubo sulcato infra sinum loborum. Typus: *M. rubra* Malme.

A single species, the type, from eastern Brazil.

EUMACROCARPAEA Ewan, subg. nov.

Frutices saepe alti vel ramosi, caulibus teretibus vel quadrangularibus lignosis; corolla pallido- vix viridi-flava; calycis lobis valde similibus subaequalibus, tubo non sulcato infra sinum loborum. Typus: *M. glabra* (L. f.) Gilg.

KEY TO THE SECTIONS

Floral leaves (subtending the lowest branch of the panicle) thick, coriaceous, the blades of the principal leaves less than 15 cm. long, more or less revolute-margined; internodes often conspicuously short, grooved and vertebra-like_____ I. Section MAGNOLIIFOLIAE [10]

Floral leaves (subtending the lowest branch of the panicle) thin and membranous or firm but not coriaceous, usually large, the blades of principal leaves 15–30 cm. long, plane; internodes not noticeably short, either terete and smooth or simply quadrangular_____ II. Section TABACIFOLIAE [11]

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[10] *Magnoliifoliae* Ewan, sect. nov. Folia inflorescentiae crassa atque coriacea, minus quam 15 cm. longa, margine revoluta, saepe nitentia; internodiis saepe conspicue brevibus, sulcatis, vertebri-formibus. Typus: *M. revoluta* (R. & P.) Gilg.

[11] *Tabacifoliae* Ewan, sect. nov. Folia inflorescentiae membranacea vel submembranacea vel crustacea vix coriacea, saepe magna, laminis principuis 15–30 cm. longis, planis; internodiis saepe elongatis, teretibus et laevibus interdum quadrangularibus. Typus: *M. obtusifolia* (Griseb.) Gilg.

KEY TO THE SPECIES

Low herbaceous perennials about 1 m. high; corolla reddish; sepals unlike, 3 obovate, rounded, thin, golden-translucent, the alternate 2 ovate, acute, green-opaque, the calyx-tube sulcate below the sinuses (subgenus *Paranagenes*). **1. M. rubra**

Tall woody perennials generally 1–3 m. high or more; corolla yellowish or greenish; sepals essentially alike, the calyx-tube not sulcate below the sinuses (subgenus *Eumacrocoarpaea*).

1*a*. Floral leaves (subtending the lowest branch of the panicle) thick, coriaceous, the blades of the principal leaves less than 15 cm. long, more or less revolute-margined; internodes often conspicuously short, grooved, and vertebralike (section Magnoliifoliae).

Flowers subtended by 2 large spatulate-obovate leaflike bracts; leaves sparsely punctate beneath---------- 2. **M. stenophylla**

Flowers not subtended by large bracts; leaves not punctate beneath (except *M. cochabambensis* and *M. chlorantha*).

2*a*. Leaves lanceolate or narrowly elliptic, acuminate or acute, long-petiolate or if ovate then at least distinctly petiolate.

Calyx divided nearly to the base, the lobes about 3–4 times as long as the tube; leaves impressed-nerved above---------- 3. **M. calophylla**

Calyx divided less than ½ to the base, the lobes ⅓ to ⅔ as long as the tube; leaves plane, not impressed-nerved above.

Calyces and pedicels cano-hirtellous; leaves both hirtellous and more or less glandular-dotted---------- 4. **M. cochabambensis**

Calyces and pedicels glabrous or hirsutulous with dark hairs; leaves very thinly if at all hirsutulous, not glandular-dotted.

3*a*. Leaves with all the veins obscure both above and below or only the midrib evident, the blades lance-ovate to narrowly lanceolate (broadly ovate in *M. cerronis*), more or less bullate; panicle mostly few-flowered (8- to 10-flowered in *M. subcaudata*).

Pedicels elongate, very slender, 15 mm. or more long; leaves lance-ovate, 12–15 cm. long, 5–6 cm. wide, the petioles 20–24 mm. long; Trinidad---------- 5. **M. arborea**

Pedicels stout, seldom as much as 15 mm. long; leaves smaller, less than 12 cm. long by 5 cm. wide.

Panicle congested; flowering branches leafy to tips; leaves crowded, broadly ovate, the petioles 6–10 mm. long; Venezuela. **6. M. cerronis**

Panicle or raceme diffuse or open; flowering branches not conspicuously leafy up to inflorescence; leaves not crowded on stems, narrowly lanceolate, the petioles 15–20 mm. long.

Leaves barely acute; raceme without leaf-like bracts, 3- to 5-flowered; Venezuela---------- 7. **M. salicifolia**

Leaves tapering to a long almost caudate tip; panicle with leaflike bracts throughout, 8- to 10-flowered; Costa Rica. **8. M. subcaudata**

3*b*. Leaves with the veins evident at least beneath, the blades generally broadly ovate, not at all bullate; panicle nearly always many-flowered.

4*a*. Panicle congested, the lowest lateral peduncles 1–4 cm. long, but little exceeding the subtending floral leaves; cauline leaves barely if at all connate-clasping.

Corolla 3.5 cm. long; calyx short-turbinate; secondary veins obscure beneath---------- 6. **M. cerronis**

Corolla showy, 4–5.5 cm. long; calyx deep-campanulate; secondary veins evident beneath.

Leaves lanceolate, at most less than 5 cm. wide, more or less tapering to a slender petiole 10–20 mm. long; ripe capsules 25–27 mm. long, on pedicels, 18–25 mm. long_ 9. **M. bangiana**

Leaves ovate, 5–9 cm. wide or more, short-acute to a petiole less than 10 mm. long; ripe capsules 18–20 mm. long, on pedicels 8–15 mm. long---------- 10. **M. glabra**

4*b*. Panicle open or more or less diffuse, the lowest lateral peduncles 7–15 cm. long, much exceeding the subtending floral leaves; cauline leaves connate-clasping by a distinct collar-like base.

Corolla 23–30 mm. long; branches of panicle less than 8 cm. long---------- 11. **M. domingensis**

Corolla 30–55 mm. long; branches of panicle 10–20 cm. or more long.

Lower panicle branches arcuately spreading; capsule ovoid, abruptly acuminate, the marcescent style long-persistent; cauline leaves commonly plicate, amphiglabrous.

12. **M. polyantha**

Lower panicle branches divaricate or straight; capsule slender, long attenuate from the base to a deciduous tip; cauline leaves plane, hirtellous on the veins beneath.

13. **M. revoluta**

2*b*. Leaves ovate to suborbicular, shortly acute or obtuse, subsessile or very shortly petiolate.

Corollas tubular, 50–60 mm. long, narrow, 5–6 mm. median diameter, the lobes short, rounded, erect; leaves crowded, the blades oblong-ovate 3.5–4 cm. long---------- 18. **M. chlorantha**

Corollas more or less campanulate, generally much shorter (less than 45 mm. long, except in *M. glabra*), broader (about 10 mm. in median diameter).

Floral leaves acute at the tips, amphiglabrous; calyx-lobes lance-acute, pale hyaline-margined to the base; corolla mostly 50–55 mm. long, the lobes in anthesis merely approximate---------- 10. **M. glabra**

Floral leaves obtuse or rounded at the tips, usually hairy along the nerves beneath; calyx-lobes low triangular or subtruncate to barely acute, narrowly scarious-margined toward the tips; corolla 35–45 (seldom 55) mm. long, the lobes in anthesis broadly overlapping.

Leaves impressed-nerved above, the veins prominently raised beneath; corollas mostly 4–5.5 cm. long, thick-fleshy; pedicels densely hirtellous with golden hairs, sometimes glandular.

14. **M. pachyphylla**

Leaves plane above, the veins only moderately if at all prominent beneath; corollas less than 4 (seldom 4.5) cm. long, coriaceous but not noticeably thick-fleshy; pedicels at most only sparsely pubescent with scattered hairs, never glandular.

Branchlets not leafy up to the panicle, the cymose panicle long-pedunculate, rather open or loose; leaves 9–14 cm. long, 6–7 cm. wide, the secondaries evident below---------- 15. **M. densiflora**

Branchlets leafy up to the compact panicle; leaves 4–6 cm. long, 2–4 cm. wide, the secondaries obscure below.

Calyx-lobes spatulate-ovate, usually distinctly overlapping, broadly hyaline-scarious; leaves of flowering shoots 3–4 (or 5) cm. long, 1.5–3 cm. wide, shortly but distinctly apiculate. **16. M. quelchii**

Calyx-lobes narrowly ovate, valvate, narrowly hyaline-scarious; principal leaves 5–6 cm. long, 3–4 cm. wide, rounded at the tips---------- 17. **M. ovalis**

1*b*. Floral leaves (subtending the lowest branch of the panicle) thin and membranous or firm but not coriaceous, usually large, the blades of the principal leaves 15–30 cm. long, plane; internodes not noticeably short, either smooth or simply quadrangular (section Tabacifoliae).

Flowers subtended by a pair of small conspicuous bracts, these deltoid-orbicular, winged-petiolate; calyx-lobes prominently overlapping, dark-green, spreading, ampliate, 1 cm. long, 1.5 cm. wide------ 19. **M. bracteata**

Flowers not subtended by prominent bracts; calyx-lobes not disproportionately large or foliose.

Calyx divided nearly to the base, the lobes broad, overlapping, hyaline-margined, both calyx and distal portion of corolla finely papillate with sessile dotlike glands; leaves both amphiglabrous and punctate with fine dotlike glands---------- 20. **M. guttifera**

Calyx divided less than one-third to the base, not at all glandular (or if so then also puberulent); leaves never both amphiglabrous and punctate.

Calyx pubescent with fine matted hairs; cauline leaves obovate, 30 cm. long, 20 cm. or more wide; eastern Brazil--------- 21. **M. obtusifolia**

Calyx glabrous (or merely puberulent in *M. macrophylla* and *M. sodiroana*) or glandular-muriculate but not tomentulose; leaves oval, ovate, or elliptic.

Leaves of panicle stalk wholly unlike the lower cauline leaves (all the floral leaves ovate or lance-ovate, 8–10 cm. long, the lower cauline blades obovate, strongly acuminate at tip, 25–35 cm. long, contracted to a distinct petiole 2–4 cm. long); calyx goblet-shaped or ovoid with a distinctly incurved rim, the lobes low-triangular, broadly overlapping; corolla narrow campanulate, 22–28 mm. long; Jamaica. 22. **M. thamnoides**

Leaves of panicle stalk essentially like the lower cauline leaves, being only smaller replicas of them, the blades never strongly acuminate at tip; calyx campanulate or oblong with a flaring or erect rim.

Leaves lanceolate or elliptic, very thin membranous, the blades 20–24 cm. long, 6–8 cm. wide, borne on slender petioles 30–35 mm. long; corolla 22–26 mm. long; calyx finely verrucose-- 23. **M. micrantha**

Leaves oval or ovate, often broadly so, or suborbicular, borne on short stout petioles (at times 1–2 cm. long) or as often subsessile.

Corolla very large, 50–75 mm. long, the flower-buds acuminate to a beaklike point; calyx 12–15 mm. long; leaf-blades narrowed to a stout, winged-subauriculate, amplexicaulous petiole. 24. **M. duquei**

Corolla usually much smaller, 25–40 (or 50) mm. long, the buds rounded; calyx less than 12 mm. long (except *M. pachystyla*); leaf-blades more or less abruptly acute to a distinct sometimes amplexicaulous petiole.

Calyx-lobes suborbicular, hyaline-membranous, broadly overlapping, the calyx-tube acute at base; corolla lobes conspicuously finely crisped, pale-hyaline_____ 25. **M. corymbosa**

Calyx-lobes low, truncate to rounded, only slightly overlapping (or if distinctly so then the calyx-tube rounded at base); corolla lobes not as above.

5*a*. Panicle ample (with 2 or 3 pairs of divaricate elongate lateral branches), 20–35 cm. long, leafy-bracteate to the ultimate pedicels; upper cauline leaves subsessile or petiolate.

Upper cauline leaves 15–24 cm. wide, barely acute, subsessile by a connate-clasping base; the venation open by the secondaries deploying at the margin; corolla narrow-campanulate to salver-shaped, the lobes spreading, 7–8 mm. long; shrubs 2.5 or at most 4–8 m. high.
26. **M. macrophylla**

Upper cauline leaves 8–12 cm. wide, abruptly acuminate, narrowed to a petiole 1–2 cm. long; the venation closed by the secondaries continuing to and merging at tip; corolla open campanulate, the lobes reflexed, 10–12 mm. long; shrubs 2 m. high_____ 27. **M. valerii**

5*b*. Panicle more congested, less than 20 cm. long, not noticeably leafy-bracteate; upper cauline leaves always distinctly petiolate.

Calyx broadly cupulate, 9–14 mm. wide, the lobes lance-ovate, acute, hyaline-scarious to the base; upper cauline leaves suborbicular, barely acute, the petioles abruptly connate-clasping_____ 28. **M. pachystyla**

Calyx narrow or oblong, 7–10 mm. wide, the lobes broad, subtruncate or blunt, hyaline only at their tips; upper cauline leaves ovate, acute.

Panicle flattened-corymbose; corolla 40–55 mm. long, the lobes 11–16 mm. long_____ 29. **M. viscosa**

Panicle diffuse; corolla 35–45 mm. long, the lobes 8–9 mm. long_____ 30. **M. sodiroana**

1. Macrocarpaea rubra Malme, Arkiv Bot. 22A (2) : 3. 1928.

Slender herbaceous perennial about 1 m. high or even flowering when only 30 cm. tall, the stem simple, quadrangular, smooth or sulcate on alternate faces, glabrous throughout; leaves rather large, elliptic to lance-ovate, acute, thin, membranous, amphiglabrous, the principal blades 10–18 cm. long, 6–9 cm. wide, narrowed to a slender petiole, 4–14 mm. long; panicle now unbellike, now diffusely pyramidal, always leafy-bracteate, the flowers cymosely clustered; calyx goblet-shaped, 9–11 mm. long, the lobes unlike, 3 obovate or spatulate, rounded, crisp, thin, golden-translucent at tips, much broader than two alternate lobes which are nonmembranous, more green-opaque, acute, the calyx-tube grooved below the sinuses; corolla reddish urceolate, a little swollen at the throat, 22–28 mm. long, the lobes short, broadly ovate, 1–2 mm. long, erect; mature capsule globose, thin-walled, 12–16 mm.

long; seeds triangular or helmet-shaped, about 1 mm. broad, finely alveolate.

Type from Desiro Ypiranga, 830 m., State of Paraná, Brazil, October 27, 1908, *Dusén* s. n. (isotype, A).

Specimens examined.—Brazil: Paraná: Desiro Ypiranga, *Dusén* 6965 (US), 15790 (US), Serra do Mar, Ypiranga, 830 m., *Dusén* 17288 (A).

A highly distinctive species upon which Per Dusén founded an unpublished genus. In the present treatment it is placed in the proposed monotypic subgenus *Paranagenes*. In some particulars, notably the showy, broadly urceolate corollas, *Macrocarpaea rubra* stands between the subgenus *Eumacrocarpaea* and the genus *Rusbyanthus*. The seeds of the latter genus, however, are fundamentally different. *Macrocarpaea rubra* is a local endemic of the Paraná region. *Macrocarpaea glaziovii* Gilg, removed to the doubtful species section in this revision, may be the prior name for this plant.

2. **Macrocarpaea stenophylla** Gilg, Bot. Jahrb. Engler 22: 337. 1896.

Small shrub 1 m. high, the branchlets quadrangular, glabrous throughout, internodes short, 3.5–6 cm. long, but often longer than the leaves; leaves ovate-oblong, obtuse or shortly acute at both apex and base, coriaceous and a little revolute, sparsely punctate-dotted beneath, nearly or quite glabrous, 2.8–3.8 (or "5.5") cm. long, 12–18 mm. wide, on short petioles, 2–3 mm. long; panicles congested, the 4–6 flowers borne in short-pedunculate leafy-bracteate cymules; flowers light-green, subtended by 2 large spatulate-obovate leaflike bracts, 10–16 mm. long; calyx short-campanulate, 6–9 mm. long, the lobes low, rounded, thin hyaline margined; corolla turbinate-campanulate, 32–35 mm. long, the lobes ovate to suborbicular, 7–10 mm. long; capsule unknown.

Type from between Pacasmayo and Moyobamba, Mojón Cruz, between Ventilla and Bagazán, 3,300 m., Dept. Amazonas, Peru, *Stübel* 24c.

Specimen examined.—Peru: Amazonas: La Jalca, between Chachapoyas and Moyobamba, January 20, 1930, *L. Williams* 7582 (F).

This little-known but distinctive *Macrocarpaea*, readily distinguished by the subtending leaflike bracts below the flowers, resembles *M. chlorantha* in the characters of its leaves, in the congested inflorescence, and in its general habit, but the flowers of the latter species are cylindric long-tubular, suggesting those of the genus *Iochroma*, and it lacks the subtending bracts of this species.

3. **Macrocarpaea calophylla** Gilg, Bot. Jahrb. Engler 22: 339. 1896.

Shrub or subshrub, the branchlets pubescent, longitudinally grooved or ribbed below, subterete above; leaves elliptic, subcoriaceous, more or less acute glabrous, 6–9 cm. long, 4–5.5 cm. wide, evidently pinnate-

nerved, the nerves and veins impressed above, prominent beneath, petiolate, the petioles 1–2 cm. long; panicle few-flowered, the flowers disposed in pedunculate cymes, the pedicels 2.5–3 cm. long, the bracts leaflike but short; calyx nearly campanulate, coriaceous, 8–9 mm. long, the lobes almost free, rounded; corolla "dark brown," 4–4.5 cm. long, the lobes broadly ovate, rounded, about one-third as long as the tube; stamens inserted in the lower part of the tube and equaling the tube or a little exserted; anthers oblong, sagittate, recurved at anthesis; style filiform, thickened, much exceeding the tube; stigma broadly bilobed, the lobes suborbicular.

Type from San Sebastián de la Sierra, 4,500 m., "Prov[ince of]" Santa Marta, now Dept. Magdalena, Colombia, 1843, *Funck* 530.

The above description is based on the original diagnosis, no specimen having been seen. The occurrence of several endemic plant species in the Sierra de Santa Marta suggests that *Macrocarpaea calophylla* may, likewise, prove to be an endemic species of that range.

4. **Macrocarpaea cochabambensis** C. Gilg, Notizb. **13:** 381. 1936.

Small slender tree or subshrub to 6 m. high; stems laterally compressed and sulcate, leafy up to the flowers; leaves oval to oblong-ovate, rather thin, 7-13.5 cm. long, 5-9 cm. wide, glabrous above except along midrib, thinly hirsutulose and black glandular-dotted beneath, all shortly petiolate, the petioles rather prominently amplexicaulous; panicle ample, diffuse, leafy-bracteate, the branches and pedicels densely hirsutulose with white spreading simple or branching hairs; calyx urceolate-campanulate, 11-13 mm. long, the lobes suborbicular, conspicuously overlapping, erosulate; corolla greenish-white, turbinate-campanulate, 38–45 mm. long, the tubes flaring above the calyx, the lobes narrowly ovate, 8-10 mm. long; immature capsule nearly spherical, included within the calyx, tipped by the tardily deciduous style.

Type from forest, Incachaca, 2,300 m., Prov. Chapare, Dept. Cochabamba, Bolivia, January 30, 1929, *J. Steinbach* 8992 (isotype, F, Mo).

Additional collection.—Bolivia: "Near Yungas, 4000 ft. 1885," *Rusby* 1172 (NY).

Rusby wrote of this Yungas specimen in 1898 (Bull. Torrey Club **25:** 545) "Macrocarpaea sp. apparently undescribed, near *M. bogotense* Gilg . . . . Mature leaves wanting" and later gave it a commemorative specific name for Gilg, but this was never published.

The specimen at the Gray Herbarium bearing the label of *Steinbach* 8992 is not an isotype of *Macrocarpaea cochabambensis* but represents, rather, *Rusbyanthus cinchonaefolius* Gilg.

5. **Macrocarpaea arborea** (Britton) Ewan, comb. nov. Plate 1
Chelonanthus arboreus Britton, Bull. Dept. Agr. Trin. & Tob. **19:** 230. 1922.

Tree 3–5 m. high, "with a few nearly upright branches and a smooth

trunk 3 or 4 inches in diameter near the ground," glabrous throughout, the stems at least above subterete; leaves elliptic, thick-coriaceous, dark-green, 5-10 (or 14.5) cm. long, 2.5–4.5 (or 7) cm. wide, the mid-vein prominent beneath, the lateral veins wholly obscure, the apex acute or short-acuminate, the base narrowed or subcuneate, the rather stout petioles 1–2 (or 3) cm. long; panicles rather strict, long-pedunculate, more or less dichotomously branching, 5- to 7-flowered, the bractlets lance-subulate, 3–5 mm. long, the pedicels slender or at times stout, rather unusually (6–12 mm.) long, decurved after anthesis; calyx turbinate- or shallowly campanulate, 8–10 mm. long, barely acute or rounded at the base, the lobes triangular-ovate, acute, rather broadly hyaline-margined, 6–8 mm. long, conspicuously overlapping; corolla tubular-campanulate, greenish-yellow or greenish-white, 2-3 cm. long, the lobes short, rounded; stamens about as long as the corolla-tube; stigmas flat, oblong; capsule ovoid-oblong, abruptly contracted to a stout beak, 18–21 mm. long (excluding the beak).

Type from "forested bank near summit of Mount Tucuche," Trinidad, British West Indies, April 3–5, 1920, *Britton, Hazen,* & *Mendelson* 1295 (NY).

Specimens examined.—TRINIDAD: Blanchisseuse Road, top of Morne Bleu, May 16, 1926, *W. E. Broadway* 6207 (sterile) (US); Mount Tucuche, 900 m., April 20, 1945, *J. S. Beard* 473 (A, photo at US, USNA).

Of the discovery of this evidently rare species Britton wrote:

> One of the most interesting wild plants observed by us in Trinidad during April, 1920, was a small tree of the Gentian family, growing at the top of the precipitous northern slope of Mount Tucuche a short distance from the summit; we had gone a few feet off the excellent path up this mountain and plunging through dense undergrowth came out at the top of the slope and face to face with this curious plant, which is probably rare, for none of the several botanists who have previously explored the mountain appear to have found it; at all events it has never been described and is thus new to Science.

Britton related *Macrocarpaea arborea* to *Chelonanthus* on the basis of the plant's "much resembling" *Lisianthus frigidus* (Sw.) Urban, of St. Vincent and Guadeloupe, which has, in turn, been assigned to *Calolisianthus* by Gilg. However, as even Britton pointed out, *Chelonanthus frigidus* has fewer or solitary and larger flowers than the arboreal species under discussion. The corolla of *C. frigidus* is more-over, salverform like that of *Calolisianthus*, a fact which Britton did not consider. Corolla form, in my opinion, is the critical criterion of relationship among the major groups within what was included in the original inclusive genus *Lisianthus.* Thus, the St. Vincent *Lisianthus frigidus* may be referred to *Calolisianthus*, following Gilg; *Chelonanthus arboreus* of Trinidad, to *Macrocarpaea.*

MACROCARPAEA ARBOREA (BRITTON) EWAN

1884414
CHICAGO
NAT. HIST. MUSEUM

60058 PLANTS OF VENEZUELA Type
Macrocarpaea cerronis Ewan
Shrub, common, 3-5 feet tall; corolla dull green; leaves coriaceous, dark green above, pale green below

MACROCARPAEA CERRONIS EWAN

MACROCARPAEA SALICIFOLIA EWAN

MACROCARPAEA REVOLUTA (R. & P.) GILG

6. Macrocarpaea cerronis Ewan, sp. nov. PLATE 2

Frutex intricate ramosus 1–2 m. altus, ramis quadrangularibus, ad apicem foliosis; foliis ovatis vel breviter ovato-lanceolatis cuspidatis vel breviter acutis, crassis, utrinque glabris, 5–7 cm. longis, 2–4 cm. latis, margine revolutis, costa manifesta et nervis secondariis infra obscuris, basin versus sensim in petiolum ca. 5 mm. longum contractis; paniculis cymosiformibus floribus 6–12; calyce breviter campanulato vel turbinato, lobis ovatis, acutis, 6–7 mm. longis, hyalino-scariosis; corolla campanulata, subviridi, 3.5 cm. longa, lobis rotundatis, ovatis, 8–10 mm. longis; genitalibus inclusis; capsula immatura ovoidea, acuta, 1.5 cm. longa.

Rather intricately branched shrub 1–2 m. high, the stems quadrangular, at least distally leafy up to the panicle; leaves ovate to short ovate-lanceolate, cuspidate or shortly acute, thick, amphiglabrous, 5–7 cm. long, 2–4 cm. wide, revolute, the midrib evident but secondaries obscure beneath, narrowed at base to a petiole about 5 mm. long; panicle rather cymose, 6- to 12-flowered; calyx short-campanulate to turbinate, the lobes ovate, acute, 6–7 mm. long, hyaline-scarious margined; corolla dull green, 3.5 cm. long, campanulate, the tube flaring above the calyx, the lobes rounded, ovate, 8–10 mm. long; stamens included; immature capsule ovoid, acute, 1.5 cm. long.

Type in the Chicago Natural History Museum, No. 1184414, collected on Sororopán-tepuí, State of Bolívar, Venezuela, 2,225–2,255 m. elevation, November 13, 1944, by *Julian A. Steyermark* (No. 60058) (isotype, US).

It is of phytogeographic interest that the nearest relative of *Macrocarpaea cerronis* and of *M. salicifolia*, two species of the Venezuelan *cerros*, is *M. arborea* (Britton) Ewan from the Northern Range, Trinidad, B. W. I. These three species are recognizable as a group by their lanceolate to short-ovate leaves having a distinct midrib but with the secondary veins obscure beneath. From the Trinidad *M. arborea*, *M. cerronis* differs in its short-petiolate somewhat smaller leaves, crowded on the branchlets, and the larger more urceolate corollas with larger more spreading lobes.

Macrocarpaea cerronis, known only from Sororopán-tepuí, where it is said to be a common shrub, is closely related to *M. salicifolia* from the adjoining mesa of Ptari-tepuí. It will be noted that *Macrocarpaea cerronis* occurs at a considerably higher elevation than *M. salicifolia*. It is perhaps significant that of the two related Venezuelan species the one occurring at the lower altitude most nearly agrees in its morphology with *M. arborea* of Trinidad. The foliage characters of the two species are at once distinct but the corollas are of the same size, have nearly the same color, and corolla limb, though *M. cerronis* has a somewhat more ventricose corolla tube. The time of flowering is evidently the same. Here we may be observing the near-

contemporaneous emergence of two species from a single ancestral species accompanied by the geographic isolation of the two segregates.

7. Macrocarpaea salicifolia Ewan, sp. nov. PLATE 3

Frutex strictus 2.5–3.5 m. altus, caulibus subquadrangularibus ubique laevibus; foliis ovatis vel lanceolatis, crassis acutis abrupte cuspidatis subcuneatis basin versus sensim in petiolum 1.0–1.5 cm. longum contractis, margine revolutis, costa manifesta et nervis secondariis utrinque obscuris utrinque glabris opaco-viridibus infra pallidioribus, 11–13 cm. longis, 2.5–5 cm. latis; racemis 3–5–floribus, pedunculis 4–5 cm. longis, pedicellis rigidis, 1–2 cm. longis: calyce turbinato ca. 10 mm. longo, lobis ovatis, 7–8 mm. longis, scariosis vel hyalino-marginatis; corolla campanulata, 3.5 cm. longa, viridi, lobis late ovatis, suborbicularibus, 10 mm. longis, approximatis; capsula immatura ovoideo-pyriformi, 1.5 cm. longa, stylo persistenti 2.0–2.5 cm. longo.

Upright shrub 2.5–3.5 m. high; stems simple, weakly quadrangular, smooth throughout, moderately leafy up to the few-flowered raceme; leaves ovate or lanceolate, simply acute to abruptly cuspidate, somewhat cuneate at the base to a petiole 1–1.5 cm. long, thick, narrowly revolute, the midrib prominent, lateral veins obscure on both surfaces, amphiglabrous, dull green above, paler beneath, 11–13 cm. long, 2.5–5 cm. wide; raceme 3- to 5-flowered, barely exceeding the uppermost leaves, the peduncle 4–5 cm. long, pedicels stout, 1–2 cm. long; calyx turbinate, about 10 mm. long, the calyx lobes ovate, 7–8 mm. long, broadly scarious or hyaline-margined; corolla campanulate, 3.5 cm. long, green, the lobes broadly ovate, rounded, 10 mm. long, approximate; immature capsule ovoid-pyriform, 1.5 cm. long, the persistent style 2–2.5 cm. long.

Type in the Chicago Natural History Museum, No. 1184028, collected in vicinity of "Misia Kathy Camp," on the mesa between Ptari-tepuí and Sororopán-tepuí, State of Bolívar, Venezuela, 1,615 meters elevation, November 15–17, 1944, by *Julian A. Steyermark* (No. 60279).

Additional specimen examined.—VENEZUELA: Bolívar: Forested sandstone south-facing slopes between plateau portion and "Cave Camp," Ptari-tepuí, 1700–1800 m., *Steyermark* 59721 (F, US).

The relationships of this species are with *Macrocarpaea cerronis*, of Venezuela, *q. v.*

8. Macrocarpaea subcaudata Ewan, sp. nov.

Frutex, parte superiore caulis subtereti laevi; foliis lanceolatis, subcaudatis et revolutis, costa subtus manifesta venis secondariis subtus subobscuris supra obscuris, utrinque glabris, supra saturate viridibus, subtus pallidioribus; paniculis 8–10–floribus; calyce breviter campanulato, 10 mm. longo, lobis suborbicularibus, submembranaceis

et subciliolatis, 3–4 mm. longis; corolla verisimiliter ochroleuca, 26–30 mm. longa, lobis angustis ovatis acutis margine pallidis, 5–6 mm. longis; staminibus vix exsertis (?); capsula ignota.

Slender shrub about 2 m. high (?); upper stems nearly terete, essentially smooth, sparingly leafy up to the panicle; leaves lanceolate, tapering to a subcaudate tip, narrowly revolute, the midrib evident beneath, secondaries faint below, obscure above, amphiglabrous, dark olive green above, paler beneath, 11–12 cm. long, 3.0–3.5 cm. wide, narrowed to a slender petiole 1–2 cm. long; panicle 8- to 10-flowered, the flowers apparently yellowish; calyx short-campanulate, 10 mm. long, the lobes rounded, very thin, faintly ciliolate, 3–4 mm. long; corolla narrow campanulate, 26–30 mm. long, the lobes narrowly ovate, acute, a little pale on the margins, 5–6 mm. long; stamens barely exserted (or only appearing so upon wilting?); capsule unknown.

Type in the U. S. National Herbarium, No. 1080493, collected in the vicinity of La Palma, Costa Rica, at 1,500 meters elevation, November 1902, by "C[arlos] W[ercklé]" (No. 16492).

The type of *Macrocarpaea subcaudata* has the leaves rather strongly revolute beyond what may be expected in this genus. A biographical note on the collector, I believe, will elucidate the cause of this somewhat collapsed condition of the type specimen. P. C. Standley writes [12] of Carlos Wercklé and his work in Costa Rica in these words:

> **Wercklé collected less extensively than the other persons named [i. e., H. Pittier, A. Tonduz, etc.] but discriminately, giving his attention to special groups, particularly bromeliads and orchids. The majority of endemic bromeliads of Costa Rica were described from his collections. His specimens usually were disgraceful, for on his tramps over the country he used to cram any strange plants into his pockets or into a bag, and they reached the herbarium in a sad state, but still in good enough condition for study. After all, such a method of collection is not ill adapted to bromeliads.**

More difficult to settle is the exact origin of the type, since there are three localities in Costa Rica bearing the same place name "La Palma," the only designation on the original label. Fortunately the notation "1500 ms." guides me in deciding in favor of its being the La Palma on the old road from San José to the Atlantic coast.

9. Macrocarpaea bangiana Gilg, Bot. Jahrb. Engler **22**: 335. 1896.

Slender shrub 1.5–2.5 m. high, the branchlets quadrangular, the uppermost subterete with short internodes, glabrous or thinly puberulent, asperulate below; leaves approximate, the blades lance-oblong to lanceolate, acute, 9–15 cm. long, 3–5 cm. wide, strongly veined and strigulose along veins beneath, microlepidote, glabrous and shining above, petiolate, the petioles 12–18 mm. long; panicle compound-

[12] Field Mus. Bot. 18 (1): 50. 1937.

cymose, leafy-bracteate, the lateral branchlets stiffly divergent, stout, rather short, 6–7 cm. long; flowers showy, large, the corollas 4.5–4.8 cm. long, funnelform-campanulate, the lobes ovate-rounded, 12–14 mm. long; stamens barely exserted, the anthers 7 mm. long; stigma bilamellate, deltoid-expanded; capsule almond-shaped, 25–28 mm. long, glabrous, tipped by short persistent style; seeds unknown.

Type from Yungas, Bolivia, *Miguel Bang* 520 (isotypes, F, G, MO, NY, US).

Additional specimen examined.—Bolivia: Dept. de La Paz, above Santa Bárbara, 6,500 feet. *R. S. Williams* 1561 (NY).

This narrow-leaved species belongs to the same group as *Macrocarpaea viscosa* (R. & P.) Gilg, of which it may be a geminate species of the eastern slope of the Bolivian Cordillera Oriental though the Peruvian *M. viscosa* is little known. *M. bangiana* is not, on the other hand, related to *M. glabra*, as suggested by Gilg, a species misinterpreted by him. *Williams* 1561 was not identified by Gilg as this species; he annotated a sheet in 1904 to the effect that, "sine floribus haud accuratius determinanda," yet this fruiting collection is clearly this species even to the minute pubescence characters. It was made the type of an unpublished species by Rusby.

10. **Macrocarpaea glabra** (L. f.) Gilg in Engler, Pflanzenfam. 4²: 94. 1895.
Lisianthus glaber L. f. Suppl. 134. 1781.
M. bogotana Gilg, Bot. Jahb. Engler **22**: 337. 1896. Based on (1) *Lisianthus glaber* sensu H. B. K. Nov. Gen. & Sp. **3**: 183. 1819, in turn based on *Humboldt and Bonpland* coll. from "[Santa Fe de] Bogotá"; also based on (2) *Triana* 1965, from vic. Bogotá, and (3) *Holton* 470, from Montserrat above Bogotá, Dept. Cundinamarca, Colombia. Three sheets of *Holton* 470 (GH, NY, PH) and a probable duplicate of *Triana* 1965 (US No. 1481182), though labeled only "Bogotá," have been studied.

Shrub 1.5–2.5 m. high, stems quadrangular, longitudinally grooved, mostly with numerous short erect rather leafy branches, glabrous throughout up to the puberulent pedicels, the internodes usually short, one-half as long to about equaling the leaves; leaves oval or lance-ovate, 5–14 cm. long, 3.5 to 6.5 cm. wide, with a firm cartilaginous margin, plane or narrowly revolute, amphiglabrous or with a few scattered hairs along the midrib beneath, bifacial, lower side paler, nervose, dark olivaceous shining above, subsessile, but only uppermost distinctly connate-clasping; panicle narrow, the laterals divergent, not more than 10 cm. long, mostly 3–5 cm., leafy-bracteate, the floral leaves little reduced over the principal cauline leaves, the cymules usually congested, 6- to 10-flowered; calyx cylindric-campanulate, 11–14 mm. long, subglabrous to puberulent, the lobes triangular-ovate, acute, only a little overlapping, thin, 4–5 mm. long; corolla greenish yellow, salver-shaped, 40–55 mm. long, early shriveling, the lobes deltoid-ovate, 8–12

mm. long, 4–10 (or 12) mm. wide; capsule relatively short, ovoid at maturity, 18–20 mm. long; seeds quadrate, thin, 0.5 mm. long, honey-colored, irregularly roughened.

Type from "America meridionali," certainly from Colombia, and likely from Bogotá, communicated by *José Celestino Mutis* (type in Linnaean Herb., London; isotypes, *Mutis* 4562 US 1562647, Madrid Bot. Garden).

Specimens examined.—COLOMBIA: Cundinamarca: Mount Guadalupe near Bogotá, 3,350 m., *Niemeyer* 215 (US). Montserrate, *Dawe* 11 (US); *Pérez Arbeláez* 1058 (US); *Killip* 38076 (US). Sierra de Siete Picos, 2,900–3,100 m., *Cuatrecasas* 5672 (US). Los Gaques, w. slope of Páramo de Guasca, 3,250 m., *Killip* 34074 (US). Santa Fé de Bogotá, *Purdie*, s.n. (GH). Las Cruces, Bogotá, *Pennell* 2195 (PH). Without locality, *Mutis* 90 (US), 333 (US).

Macrocarpaea glabra is apparently localized in the Bogotá region where it is a familiar shrub scattered among the páramo vegetation on the mountains above the city. A single collection, *García-Barriga* 12061, from between San Miguel and Aguadita, 1,980–2,360 m., Dept. Cundinamarca, described by the collector as a small tree 3.5 m. high, has the corolla more flaring-campanulate, the tube narrow above the calyx. It deserves close study in the field.

The Mutis illustration referred to in the original description by the phrase "Icon. Mutis. Amer. v. 2. t. 1." is one of a collection of plates on the flora of Colombia, unpublished, preserved in the Library of the Linnean Society of London (cf. Pritzel, *Thesaurus*, ed. 2, item 6590). In the original description the petiolate condition of this species was over-stressed but the statement must be checked against the contemporary broad definition of the genus *Lisianthus*, many species of which have strongly sessile leaves.

Upon our request, Dr. Arturo Caballero, of the Madrid Botanic Garden, compared *Mutis* 4562 in the Madrid Herbarium with the Mutis plates and reported that they unquestionably represent the same species. These Madrid plates have been studied first by Triana and more recently by Killip, who has published a brief account of this Mutis collection (Bull. Pan Amer. Union **67:** 162–171, illus. 1933), but they have not been collated with the series in the Linnean Society at London.

There is a sheet of a poor inflorescence in postanthesis in the Herbario Nacional Colombiano (No. 20125), labeled "*Lisianthus glaber*" and the source given as "Prov. de Bogotá, alt. 2,700 m. Junio 1855," collected by Triana, "3550 [=genus number]—3 [=species number]," which is almost certainly *Macrocarpaea macrophylla* and very doubtfully from the Bogotá region. The Colombian National Herbarium, which possesses a good set of Triana plants, has no collection of *M. glabra* collected by Triana, but it does contain another sheet of *M.*

macrophylla taken by him, with the original label (No. 16738). Sheet No. 20125 may have the wrong label attached.

There is a sterile sheet from Venezuela (State of Mérida: between La Cumbre, San José, and Mucutuy, 1,820–2,590 m., *Steyermark* 56239) which resembles *M. glabra* in its leaf characters and old dried inflorescences of the previous year, but may prove to be an undescribed *Macrocarpaea.* The leaves are unlike any Venezuelan species of *Symbolanthus* known to the writer.

11. **Macrocarpaea domingensis** Urb. & Ekman, Arkiv Bot. 23A (11) : 30. 1931.

Shrub 2–3 m. high, the branchlets stout, nearly terete above, grooved or angled, glabrous up to the pedicels, the upper internodes short; leaves lanceolate to oblong-oval, barely acute or blunt at the tip, 14–16 cm. long, 5.0–6.5 cm. wide, smooth and shining on both surfaces, the veins more evident beneath, all petiolate, the petioles sometimes wing-margined, 1.0–1.5 cm. long; panicle moderately ample, the branches rather arcuately spreading or ascending, 6–8 cm. long, the flowers loosely clustered in leafy-bracteate cymules; calyx short-campanulate, 7–9 mm. long, acute at base, glabrous, the lobes rounded, broadly overlapping, 3 mm. long, pale-scarious, minutely fimbriate; corolla greenish-yellow or yellowish, narrow-campanulate, 23–30 mm. long, the lobes ovate, barely acute, pale-scarious; immature capsule elongate-fusiform, tapering to a short marcescent style.

Type from mossy forest at the summit of La Loma Campana, 1,200 m., where it is not rare, Cordillera Central, Dominican Republic, *E. L. Ekman* H11504, February 11, 1929 (isotype, US).

Macrocarpaea domingensis, known only from the type, has not been collected on the other West Indian islands. The authors draw the distinction between this species and *M. thamnoides* of Jamaica, but it is not a close relative of that other Caribbean species. Its relationships are clearly with the Andean species, *Macrocarpaea polyantha*, *M. revoluta*, and *M. bangiana.* In the sum total of its characters *M. domingensis* is perhaps most closely related to the Colombian *M. polyantha*, from which it differs in its larger flowers, less strongly arcuate branches of the panicles, and its plane, not plicate, leaves.

12. **Macrocarpaea polyantha** Gilg, Bot. Jahrb. Engler 22: 336. 1896.

Shrub or small tree, 2–3 m. high, the branchlets stout, more or less quadrangular or nearly terete above, glabrous or subglabrous up to the lightly puberulent peduncles, the upper internodes short; leaves oblong-oval, rounded at base, obtuse at the apex, thick-coriaceous, veins evident beneath, obscure above, amphiglabrous, 11–15 cm. long, 3.5–6.5 cm. wide, even the uppermost petiolate, the petioles stout, 1–1.5 cm. long, connate-clasping by a broad expanded base; panicle

ample, branching below with elongate arcuately spreading peduncles, the flowers numerous, clustered in dense terminal leafy-bracteate cymes, the ultimate pedicels commonly nodding; calyx oblong-campanulate, 10–12 mm. long, acute or narrowed at the base, puberulent, the lobes ovate, rounded, pale scarious, minutely fimbriate; corolla sulphur- or greenish-yellow, narrow-campanulate to salverform, 30–38 mm. long, the lobes triangular-ovate, finely crisped, a little fimbriate; capsule fusiform-ovoid, abruptly narrowed to the marcescent style, 1.5–2.5 cm. long, the fruiting calyx hardening, somewhat accrescent; seeds quadrate, about 0.5 mm., finely honeycomb-pitted over the concave faces.

Type, reputedly, from "Santa Fé de Bogotá, Peña in feuchten Hainen," Colombia, *Goudot* No. 1.

Specimens examined.—COLOMBIA: Norte de Santander: Between Pamplona and Toledo, thickets along stream, 2,500–2,800 m., *Killip & Smith* 19818 (A, US). Páramo de Hatico, 2,900 m., *Killip & Smith* 20613 (A, US); Cundinamarca: Páramo de Fontibón, 2,600–2,750 m., *Cuatrecasas et al.* 12271 (US).

Macrocarpaea polyantha, as here interpreted, is the shrub of the Colombian páramos of Norte de Santander. I believe the citation of Bogotá as the source of Goudot's collection refers to the Province of Bogotá, a geographic division now abandoned. All collections of *Macrocarpaea* examined from the Bogotá region proper are referable to *M. glabra* (L. f.) Gilg. A. C. Smith, when studying the Kew material in 1931, wrote: "I am unable to find the slightest difference between *Goudot* (type of *M. polyantha* Gilg) and *Holton* 470, both from Bogotá. *Pennell* 2195 is an absolute equal of it, even in details of branching." There is the possibility that the actual Goudot type, at Berlin when studied by Gilg, differs from the Goudot sheet at Kew. All Goudot collections were only casually labeled, mostly unnumbered, and I believe Gilg may have affixed an arbitrary number to the Berlin sheet. According to Lasegue,[13] Goudot visited the emerald mines at Muzo in the present Department of Boyacá and may have traveled even farther north along the Cordillera Orientál at which time he could have taken the type of *Macrocarpaea polyantha*. However, he apparently made the trip to Bogotá via Río Magdalena and not overland from Venezuela. "La Peña" is identified by Joaquin Esguerra O. in his Diccionario Jeografico de los Estados Unidos de Colombia (1879) as "Distrito correspondiente al Departmento de la Palma, en el Estado de Cundinamarca: esta sobre el cerro . . . i a 1240 met. sobra el nivel del mar . . . Dista de Bogotá 10 miriametros." Is it possible that *M. polyantha* represents the plant collected by Garcia-Barriga (No.

[13] Mus. Bot. Deless. 471. 1845.

12061), mentioned under the discussion of *M. glabra* beyond, rather than the Norte de Santander plant? I regret that a photograph of the type of *M. polyantha* has not been available, for it would afford a check of my belief that it has been up to now mistakenly assigned to the Bogotá region.

The petiolate, obtuse, not sharply acute or acuminate leaves of this species, along with the characteristic panicles with crowded cymules borne on outwardly curving branches and often nodding flowers, distinguish it from *Macrocarpaea glabra*. Gilg's comparison of *Macrocarpaea polyantha* with the Bolivian *M. bangiana* takes on additional significance when this endemic Norte de Santander plant is considered as distinct from the Bogotá shrub, since the leaf characters of the two geographically distant species agree closely.

13. **Macrocarpaea revoluta** (R. & P.) Gilg in Engler, Pflanzenfam. 4²: 94. 1895.

PLATE 4

Lisianthus revolutus R. & P. Fl. Peruv. Chil. 2: 14. pl. 127. 1799.

Slender open shrub or small tree, 2–4 m. high; branches few, spreading, subterete above, weakly several-angled below, glabrous or pedunc**l**es puberulent or finely pruinose; leaves ascending, borne on short stout petioles, thick or subcoriaceous, narrowly lanceolate, acuminate, acute at base, revolute by a narrow firm almost cartilaginous margin, glabrous above, crisp hirtellous along the veins beneath, 10–14 cm. long, 4–5.5 cm. wide; panicle open, diffusely branching, bearing rather crowded many-flowered cymules at summits of elongated stout branchlets; flowers waxy cream-colored, short-pedicellate, the pedicels pruinose-puberulent; calyx short-campanulate, 6–9 mm. long, the lobes short, 2.0–2.5 mm. long, often flaring, little if at all overlapping; corolla campanulate, rather abruptly ventricose, 30–35 mm. long, the lobes triangular-acute, about 1 cm. long; capsule slender, lance-tapering, 32–38 mm. long, often abruptly acute to a short style; seeds more or less quadrate in outline, 0.5–0.8 mm. long, irregularly and lacerately winged, golden-brown, the body finely alveolate.

Type from "montibus altis frigidis," Muña to Saria, Pachitea, Peru, *Ruiz & Pavón* (authentic material, F 843608, which is plate 4).

Specimens examined.—PERU: Junín: La Merced, 700 m., *Macbride* 5224 (F). Amazonas: Between Chachapoyas and Moyobamba, *L. Williams* 7596 (F).

The Ruiz and Pavón plate is in essential agreement with the authentic collection in Chicago Natural History Museum from the herbarium of the Madrid Botanic Garden, except that the cymules are illustrated as 3- or 4-flowered when they are rather 8- to 20-flowered. The petioles in the specimen are completely amplexicaul by a narrow-cupulate base. The veins, moreover, are drawn as too prominent, especially those of the upper leaf surface. A similar discrepancy between a plate pub-

lished by Ruiz and Pavón and modern collections of the plant in question was noted by F. W. Pennell for *Calceolaria tripartita* R. & P. Pennell found flowers and foliage wrongly associated and comments upon the error: "such reconstructions and generalizations occur elsewhere among Ruiz and Pavón's illustrations" (Proc. Acad. Nat. Sci. Philadelphia **97:** 174. 1945).

Saria Hill is mentioned only once in the narrative of Ruiz on his "Travels in Peru and Chile" (*op. cit.* 234), in describing a trip of October 1787, but it may be located with reference to Chacahuasi and Muña as lying in headwaters of the Río Huallaga of the Cordillera Orientál of northern Peru. Evidently it is a plant of cold pygmy forests just below the true puña.

There is a Weberbauer collection in both flower and fruit (6116), without locality data,[14] in the Chicago Natural History Museum Herbarium, which for the present may be referred to this species. The inflorescence—a single long-pedunculate umbellike cluster of 7–12 flowers—is singular in the genus *Macrocarpaea*, recalling *Calolisianthus*. The leaves of the flowering branch are narrowly lanceolate, those of the lower stem, accompanying the separate fruiting branch, broadly ovate. The narrow fusiform capsules clearly identify the plant as a *Macrocarpaea*.

14. **Macrocarpaea pachyphylla** Gilg, Bot. Jahrb. Engler **22:** 338. 1896.

Tall slender arborescent perennial, 3–4 m. or more high, the branches leafless below, sparingly branching above, decussate, bearing leaves in clusters or tufts at the ends of the shorter laterals; stems weakly quadrangular, glabrous or nearly so; leaves of sterile shoots oval or oblong-ovate, 15–18 cm. long, 7.0–8.5 cm. wide, short-petiolate by a connate-clasping base, glabrous above, hirsutulous or setulose with pustulate hairs below, microlepidote on both surfaces, especially below, the veins prominent, the leaves of fertile shoots few and soon reduced above to bracts subtending branches of the panicle, these sessile, subrotund or short-ovate, strongly revolute, impressed-venose, all thick-coriaceous; panicle ample, open-cymose, leafy-bracteate throughout, the cymules 5- to 12-flowered, the flowers showy, the peduncles and pedicels densely setulose; calyx short-campanulate, 10–12 (or 18) mm. long, the lobes low-triangular, blunt, narrowly scarious margined; corollas salver-shaped, 3.5–5.5 cm. long, flaring almost evenly upward

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[14] No. 6120, *Macleania farinosa*, was collected east of Huancabamba, Cajamarca, Peru and No. 6116 may be from the same region. In the course of an account of the "Mesotherm evergreen forest" of the Basin of Bellavista and the surrounding Mountains, Weberbauer enumerates *Schefflera* (6118) and *Baccharis* (6119) as components of this forest, all of which along with No. 6116 must have been taken in this region (El Mundo Vegetal de los Andes Peruanos 516. 1945).

to the broad limb 4 cm. wide, cream-yellow, of a very thick-fleshy texture, the corolla lobes triangular-ovate, distinctly overlapping; capsule unknown.

Type from "Prov[ince of] Pasto," Dept. Nariño, "Ecuador" [error for Colombia], 3,300 m., 1847, *Wm. Jameson* 467 (isotype, US).

Specimens examined.—COLOMBIA: Putumayo: Páramo de San Antonio del Bordoncillo, below El Encano and Sibundoy, 3,250 m., *Cuatrecasas* 11785 (US). Nariño: Río de Potreros above Soledad, 3,400 m., Río Tellez drainage, *Ewan* 16531 (USNA). ECUADOR: Loja: Between Loja and Zamora, 1 XII 1876, *André* 4513 (F).

Though scattered citations in botanical monographs record the fact, no published account, either by Jameson himself or by others about his botanical activities,[15] gives any clue as to his ever having botanized in what is now Colombia proper. But the isotype examined bears a characteristic ticket reading "467 Lisianthus ———. Province of Pasto at 10,000 feet of elevation." Jameson's collection is a good match for a recent collection, *Cuatrecasas* 11785 from the region bordering Dept. Nariño and Com. Putumayo.

15. **Macrocarpaea densiflora** (Benth.) Ewan, comb. nov.
Lisianthus densiflorus Benth. Pl. Hartw. 227. 1846.

Slender low tree or shrub, the branchlets rather stout, elongated above, nearly terete or terete-compressed, thinly dingy puberulent; leaves oval to obovate, rounded or barely acute at the tip, short-cuneate to a subsessile base, 9–14 cm. long, 6–7 cm. wide, venation prominent beneath, glabrous and shining above, fine hirsutulous beneath, especially along the veins; panicle long-pedunculate, rather compact, leafy-bracteate, the cymules 2- to 5-flowered; calyx oblong-campanulate, 10–12 mm. long, squarish at base, the lobes triangular-ovate or rounded, narrowly scarious margined, little if at all overlapping; corolla greenish-yellow, campanulate, gradually flaring above, 40–45 mm. long, the lobes ovate; capsule not seen.

Type from vicinity of Pitayo, Dept. Cauca, Colombia, *Hartweg* 1241.

Specimens examined.—COLOMBIA: Dept. Bolívar: Below Páramo de Chaquiro, 2,800–3,100 m., Cord. Occidental, *Pennell* 4334 (PH). Dept. Cauca: Páramo de Moras: 3,000–3,500 m., Cord. Oriental, *Lehmann* 2087 (US).

Bentham, when describing this species, gave its habitat as the forests of "quina naranjoda" (*Cinchona pitayensis*) and Pennell records "shrub zone" on his label.

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[15] Biographical notice by Isaac Anderson-Henry in Trans. Proc. Bot. Soc. Edinb. 12: 19–28. 1873. Cf. also Ludwig Diels, Beiträge zur Kenntnis der Vegetation und Flora von Ecuador 47. Stuttgart, 1937 (Spanish transl. by R. Espinosa, Univ. Central, 109–110. Quito, 1938).

Macrocarpaea densiflora may be distinguished from *M. ovalis*, which grows in the same general region of Colombia but which is unknown from the Western Cordillera, by its long-pedunculate cymose panicles, borne well above the leaves, whereas *M. ovalis* has the branchlets leafy up to the inflorescence. The flowers in the present species average larger. The leaves of *M. ovalis* have the secondary veins weak or obscure; the blades are much smaller and more narrowly oval than those of *M. densiflora.*

From *Macrocarpaea pachyphylla*, which also grows in the same region in southern Colombia, *M. densiflora* may be distinguished by the smooth and shining upper leaf surfaces, rather than the impressed-nerved condition of *M. pachyphylla.* The corollas in the latter species are fewer, larger, and borne on stout pedicels; furthermore, the lower peduncles are each subtended by rounded, thick-textured, revolute-margined bracts much resembling the leaves.

16. **Macrocarpaea quelchii** (N. E. Brown) Ewan, comb. nov.

Lisianthus quelchii N. E. Brown, Trans. Linn. Soc. II, Bot. 6: 50. pl. 8. figs. 6–9. 1901.

Dwarf glabrous shrub 1–2.5 m. high, the branchlets slender, more or less quadrilaterally compressed, the internodes very short, 0.5–1.5 cm. long, finely muriculate or almost tessellate below; leaves crowded at end of branchlets, closely imbricated, the blades oblong-ovate, rounded or abruptly apiculate, firmly but narrowly revolute, coriaceous, 3–5 cm. long, 1.5–3 cm. wide, all cuneate or contracted to a short petiole less than 5 mm. long, dark green above, dull green beneath, the secondaries obscure on both surfaces; flowers 2–3 in a terminal ill-defined cyme (or rarely solitary?), more or less hidden among the uppermost leaves, short-pedicellate, the calyx short-campanulate, about 1 cm. long, the lobes spatulate- or oblong-ovate, hyaline-margined; corolla cylindric-campanulate, 28–44 mm. long, greenish or "deep olive-green", the lobes ovate or rounded, approximate, entire or crispulate; young capsule ovoid, about 2 cm. long, attenuate to a slender style.

Type from summit of Mount Roraima, 8,600 feet, *McConnell & Quelch* 106 and 649. The illustration identifies the species unmistakably.

Specimens examined.—Venezuela: Bolívar: Southwest-facing portion of sandstone ledge just below summit, 2,560–2,620 m., Mount Roraima, *Steyermark* 58802 (F, US); forested southwest-facing quebrada near Rondon Camp, 2,040 m., *Steyermark* 58672 (F, US).

It is now generally admitted that essentially all plant collections from Mount Roraima actually were obtained not in British Guiana but in Venezuela. This view is based on the fact that the ascent of the mountain has been made by all exploring parties since Richard Schomburgk in 1842 from the Venezuelan side and that all the summit

collections made there have been taken from within the political boundaries of Venezuela. This view has been supported by the ornithologist W. H. Phelps in writing on "The Geographical Status of the Birds collected at Mount Roraima" [16] and more recently restated by A. Dugand and W. H. Phelps in a paper [17] on birds of the Upper Orinoco River.

This Roraima endemic species is most closely related, as N. E. Brown originally pointed out, to *Lisianthus ovalis* R. & P., that is, to *Macrocarpaea ovalis* (R. & P.) Ewan of the present treatment.

17. **Macrocarpaea ovalis** (R. & P.) Ewan, comb. nov.
Lisianthus ovalis R. & P. Fl. Peruv. Chil. 2: 13. 1799.
Helia ovalis (R. & P.) Kuntze, Rev. Gen. Pl. 428. 1891.
Macrocarpaea arborescens Gilg, Bot. Jahrb. Engler 50: Beiblatt 111: 50. 1913. Type from west of Popayán, Cord. Occ., 1,800–2,500 m., *Lehmann* 5450 (isotype, US).

Tall, slender shrub or small rather densely crowned tree, 2–3 m. high; branchlets slender, erect, with short internodes, glabrous, terete or grooved above; leaves oval, obovate or short oblong-ovate, obtuse at summit, rounded or a little narrowed at base, appearing narrowly revolute because of a firm subcartilaginous border, shining above, veins obscure both above and below, faintly glandular-punctate beneath, 5–6 cm. long, 3–4 cm. wide, the petioles short, 3–5 mm. long; panicle crowded, leafy, the lateral branchlets short, bearing a few 5- to 8-flowered cymules; flowers not at all showy, greenish yellow, the calyx oblong-campanulate, 8–10 mm. long, obtuse at base, the lobes rounded, hyaline-margined, medianly tawny puberulent, the alternate lobes overlapping; corolla narrowly campanulate, the tube flaring but little above the calyx, 3.5–4 cm. long, the lobes ovate, acute, about 1 cm. long, very finely erosulate; capsule not seen.

Type from Chinchao, Dept. Huánuco, Peru, *Ruiz & Pavón* [or *Dombey?*] (fragment of type, F). (Field Mus. photo 29363, type in the Madrid Herbarium).

Specimens examined.—COLOMBIA: Cauca: Cord. Occidental, west of Popayán, *Lehmann* 5450 (US). ECUADOR: Loja: between Loja and Zamora, *André* 4549 (F); western slopes Cord. de Condor, along Río Cachiyacu, 2,000–3,000 m., *Steyermark* 54805 (F, US). Between Tambo Cachiyacu, La Entrada, and Nudo de Sabanillas, 2,500–3,500 m., *Steyermark* 54436 (F, US). Vicinity of Tambo Cachiyacu, 3,000–3,500 m., *Steyermark* 54758 (F). "PERU" [possibly southern Ecuador], *Wm. Lobb* (F).

There is in the Herbarium of the Chicago Natural History Museum a sheet [843437] bearing a fragment of Ruiz and Pavón collection from

[16] Bol. Soc. Venez. Cienc. Nat. 5: 83–90. 1938.
[17] Caldasia 4: 243–276. 1946.

MACROCARPAEA BRACTEATA EWAN

Madrid Botanic Garden Herbarium, labeled "Hualasco and Loxa." The former locality is probably Peruvian but does not appear in the Relación del Viaje of Ruiz (Dahlgren, transl.). It has not otherwise been located. Furthermore, though Pavón is reputed to have collected at Guayaquil, neither he nor Ruiz nor Dombey is known to have botanized in the Loja region. Yet the fragment agrees very closely with the original description of *Lisianthus ovalis* and may, indeed, represent authentic material from Chinchao, mislabeled at some time since its original collection.

As to the origin of the Lobb fragment, from "Peru," again in the Herbarium of the Chicago Natural History Museum, little can be postulated. Since the species has been reported from northern Peru, Lobb's collection may have come from that general region. On the other hand, Lobb's plant agrees almost minutely in leaf pubescence with the Ruiz and Pavón fragment reputedly from Loja, and since Lobb on the basis of his own statement is definitely known to have visited Loja,[18] it may as well have had an Ecuadorian origin.

Field notes of Lehmann accompanying the type collection of *Macrocarpaea arborescens* read, "up to 3 m. high, tree-like shrub, with fairly close, erect ramification. Leaves robust, dark green, shiny. Flowers greenish yellow-white. Colombia. Grows in dense, damp forests on the western slopes of the West Andes of Popayán, 1800–2500 m. Flowers in June."

Otto Kuntze transferred *Lisianthus avalis* to the genus *Helia*, without comment, but the following phrases in the original description indicate that the transfer to that genus (or subgenus?) cannot be maintained: "planta suffruticosa," "caules plures . . . superne parum ramosi" and "pedunculi axillares terminalesque."

When I first reviewed the Colombian species of *Macrocarpaea* I concluded *M. arborescens*, *Lisianthus ovalis*, and *L. densiflorus* to be conspecific, but further study convinced me that the first two names represented one species and *Lisianthus densiflorus* a second distinct *Macrocarpaea*. To check this conclusion against the collections at Kew, I asked N. Y. Sandwith to compare an isotype of *M. arborescens*, *Lehmann* 5450, with the type of *M. densiflora* (*L. densiflorus* Benth.), *Hartweg* 1241, and he found the last to be "obviously a different species." For the distinctions between *Macrocarpaea densiflora* and this species and a record of their distribution in adjacent districts of Colombia, see the discussion under the former species.

18. **Macrocarpaea chlorantha** Gilg, Repert. Sp. Nov. Fedde 2: 53. 1906.

Shrub 1 m. high, the branches acutely 4-angled, the internodes short, 1.0–1.25 cm. long, nearly smooth; leaves oval or oblong-oval, subro-

[18] *Cf.* Killip, Smiths. Misc. Coll. 87: 1–13. 1932.

tund or scarcely acute at apex, with a petiole 5–8 mm. long, coriaceous or subcoriaceous, 4.0–5.5 cm. long, 1.2–1.6 cm. wide, the veins and nerves hardly evident; flowers crowded at end of short lateral shoots, the cymes dense, 8- to 12-flowered, the pedicels short, 3–10 mm. long; flowers light-green, the calyx-tube tubular-campanulate, 10–12 mm. long, the lobes subtruncate or rounded; corolla long-cylindric, 45–47 mm. long, the tube narrowed below, very slightly enlarged above the calyx, the lobes rounded or suborbicular, equal, about ⅕ as long as the tube; stamens and pistil exserted.

Type from "Orientem versus a Chachapoyas inter Tambo Ventillas et Pisco Huanuma," Dept. Amazonas, Peru, *A. Weberbauer* 4411 (Field Mus. photo 26828).

Macrocarpaea chlorantha is evidently related on the one hand, and mostly closely, to *M. stenophylla* of Peru, and on the other to *M. ovalis* of Peru, Ecuador, and Colombia. The type of *M. chlorantha* comes from the same general region as does *M. stenophylla*, and the two agree very closely in habit and leaf characters. But in its long-cylindric corollas, unique in the genus *Macrocarpaea*, *M. chlorantha* is so unlike *M. stenophylla* and other species as to throw some doubt on its proper alignment in this genus. Indeed, as a species it is almost unique among lisianthoid plants recalling much more vividly certain genera of Solanaceae.

Macrocarpaea chlorantha is known to me only from the photograph of the type, the original Weberbauer collection having been destroyed in the bombing of the Berlin Botanic Garden. Necessarily, I have had to rely almost wholly on Gilg's description for the morphologic details of the species.

19. Macrocarpaea bracteata Ewan, sp. nov. PLATE 5

Herba vel suffrutex 1.5–2.0 m. altus, caulibus supra herbaceis, teretibus vel subsulcatis, glabris vel supra paucis pilis; foliis omnibus petiolatis, petiolis 1–4 cm. longis, valde connato-amplexicaulibus, laminis foliorum lucidis saturate supra viridibus glabrisque, infra pallidioribus costis hirtellis, infra conspicue venosis, saepe ovatis vel ovalibus, acutis, 11–18 cm. longis, 6–10 cm. latis, laminis foliorum superiorum inflorescentiae subcordatis margine subrevolutis; paniculis ramosis, foliosis, floribus conspicue bracteatis suborbiculatis in densis cymulis pedunculatis; calyce urceolato, lobis diformibus, duobus amplissimis cordato-suborbiculatis, patentibus, lobis alternis minus amplis et foliosis; corolla brevi inclusa, viridi-flava; genitalibus inclusis; capsula ovoidea abrupte acuta, lignosa, 20–22 mm. longa; stigmate apice persistente; seminibus minutis, 0.2 mm. longis, castaneis.

Sprawling herb or half shrub, 1.5–2.0 m. high, the stems soft-herbaceous above, terete or weakly grooved, glabrous throughout or scantily hairy at shoot tip; leaves all petiolate, the petioles 1–4 cm.

long, prominently connate-amplexicaulous, the blades dark lustrous, green and glabrous above, pale green and hirtellous on veins beneath, veiny on both surfaces but especially beneath, ovate or less often narrowly ovate, acute, 11–18 cm. long, 6 (or even 3)–10 cm. wide, the uppermost leaves of flowering shoot subcordate, narrowly revolute; panicle freely branching, leafy, the flowers subtended by a pair of conspicuous suborbicular winged-petiolate bracts, crowded in more or less pedunculate cymules, calyx broadly urceolate, two lobes ample cordate-suborbicular, spreading green or green-tipped, more or less crisped 1.0 cm. long, 1.5 cm. wide, the other lobes less ample, less foliose; corolla short, included (cleistogamous?), pale greenish yellow; capsule narrowly ovoid, abruptly acute, woody, 20–22 mm. long, tipped by the persistent capitate stigma; seeds minute, 0.2 mm. long, light brown.

Type in the Herbarium of Chicago Natural History Museum, No. 1184405, collected "in moist cloud forest on south- and southwest facing slopes" at Palojosco, above Los Apostentos, above Humocaro Bajo, State of Lara, Venezuela, 2,375–2,530 meters elevation, February 4, 1944, by *Julian A. Steyermark* (No. 55224) (isotype, US).

Additional specimens examined.—VENEZUELA: Lara: Wet meadow at Las Sabanetas, above Los Apostentos, west of Humocaro Bajo, 2530 m., *Steyermark* 55287 (F, US).

The relationships of *Macrocarpaea bracteata* are not easy to determine. The bracteate flowers are approached in the Peruvian *M. stenophylla* of the section *Magnoliifoliae*, but in the present species the terete stems, long internodes, and larger thinner-textured leaf blades are of quite a different kinship and place it with the section Tabacifoliae. The very leafy calyx lobes are unique in the genus and easily set off this species from all others. The two collections of *Macrocarpaea bracteata* at hand differ notably in their leaves, varying from broadly ovate to nearly lanceolate, yet the floral characters are unmistakable. Collections in full anthesis are a desideratum. The vernacular name is "maraquita."

20. **Macrocarpaea guttifera** Ewan, sp. nov.

Frutex 2–3 m. altus, gracilis, ramulis glabris lignosis, fissuratis; foliis petiolatis, petiolo crasso; laminis foliorum amplis, lanceolatis vel ovatis, glanduloso-punctatis coriaceis nitentibus, venis secondariis prominentibus marginem versus confluentibus; panicula pariflora pedunculo robusto; calyce cupulato, profunde lobato, lobis suborbicularibus, valde imbricatis; corolla viridi, tubo anguste campanulato, lobis oblongis acutis crassis, dense pustulato-glandulosis; antheris albis.

Slender shrub 2–3 m. high, the branchlets woody, fissured below, subterete above, wholly glabrous; leaves thick-coriaceous, lanceolate or the uppermost ovate, acuminate, 15–23 cm. long, 6.5–9 cm. wide,

punctate on both surfaces with fine golden glands, venulose; panicle long-pedunculate, nearly bractless, narrow and rather compact, of a few loose 3-flowered cymules; calyx broadly cupulate, 11–18 mm. long, all but the hyaline-scarious margin of the lobes papillate with sessile glands, the lobes divided nearly to the base, broadly oblong or suborbicular, conspicuously overlapping; corolla green, slender campanulate, 30–35 mm. long, the lobes oblong, acute, 6–7 mm. long, thick, all but the proximal portion of the tube densely papillate-glandular; anthers white; capsule unknown.

Type in the U. S. National Herbarium, No. 1356268, collected in the vicinity of Iquitos, Department of Loreto, Peru, in woods, at about 100 m. elevation, August 3–11, 1929, by *E. P. Killip and A. C. Smith* (No. 27045).

Macrocarpaea guttifera grows in Amazonian Peru along with *M. micrantha* but differs in several characters from that species. The most notable differences are the stiff, thick, shining leaves, the reduced few-flowered panicle, and broadly cupulate calyx. Especially distinctive characters are the nearly chorisepalous calyx and the papillate-glandular flower parts. The systematic position of *Macrocarpaea guttifera* cannot be suggested from the several unusual characters that it displays, which, indeed, may be subject to reinterpretation when additional material is available.

21. **Marcocarpaea obtusifolia** (Griseb.) Gilg in Engler, Pflanzenfam. 4^{2}: 94. 1895.
Lisianthus obtusifolius Griseb. Gen. Sp. Gent. 175. 1839.
Lisianthus obtusifolius var. *constrictus* Griseb. Gen. Sp. Gent. 175, 1839. Type from Minas Gerais, Brazil, *Langsdorff* in Herb. Hooker, Kew.

Woody arborescent perennial, about 2 m. high, the branches leafy mostly on the upper part; stems laterally compressed or nearly terete, sparsely pubescent below, densely setulose above with short white hairs; lower leaves large, obovate or oval, obtuse, thin, lightly hirsutulous beneath, 30 cm. long, 18 cm. wide, contracted to a short broad petiole, the upper leaves reduced, oval to obovate, obtuse, subsessile, densely hirsutulous beneath, 6–12 cm. long, 4–7 cm. wide; panicle open, loosely branching, the flowers rather crowded in leafy-bracteate terminal clusters; calyx goblet-shaped, rounded at base, 10–11 mm. long, densely white-hirsutulous, appearing viscous, the lobes obtuse; corolla turbinate, 32–45 mm. long, greenish yellow, fading orange-yellow, the tube narrow at base, abruptly flaring above the calyx, the lobes broadly triangular-ovate, crisped or erosulate on margins, 7–10 mm. long; mature capsule pyriform, 2 cm. long, glabrous, inclosed by the somewhat accrescent almost woody calyx; immature seeds obovate, narrowly winged.

Type from Sierra d'Estrella, Brazil, *Sellow*.

Specimens examined.—Brazil: "Near Rio Janeiro" [Serra do

Orgãos and Monte Corcovado], *Wilkes Expedition* [Nov. 24 1838–Jan. 6 1839] (US), "Brasilia," *Riedel* (GH). Serra do Cipó kilom. 138—estrada de Conceicão, Munic. Santa Luzia, *Mello Barreto* 8845 (F).

22. **Macrocarpaea thamnoides** (Griseb.) Gilg in Urban, Symb. Antill. 1: 387. 1900.
Lisianthus thamnoides Griseb. Fl. Brit. W. I. 424. 1864.
M. hartii Kr. & Urb. Notizbl. 1: 80. 1895. Type from Jamaica, "J. H. Hart et W Harris n. 1417, 5352." Two sheets of *Hart* 1417 (US) have been studied.

Slender subshrub 2 m. high; lower stems nearly terete or somewhat quadrangular-flattened, leafy only as a tuft at summit of stem, the panicle-stalk arising from it, in the manner of *Bocconia;* leaves of two kinds, the lower cauline obovate, strongly acuminate at the tip, 25–35 cm. long, 10–12 (or 20) cm. wide, cuneate to a distinct petiole 2–4 cm. long, connate-amplexicaulous at base, the floral leaves ovate, barely acute or somewhat obtuse, 8–10 cm. long, 4–5 cm. wide, at times lustrous-shining above, all glabrous above and below except for a slight puberulence along the midrib and larger veins beneath; panicle diffuse, the cymules contracted, pedunculate, leafy-bracteate, the branches and pedicels smooth, grooved or wing-angled; calyx ovoid or goblet-shaped, 8–9 mm. long, the lobes low-triangular, broadly auriculate-overlapping, finely fimbriate, about 1 mm. long; corolla narrowly campanulate, small, 22–28 mm. long, the lobes narrowly oblong-ovate to lanceolate, 5–6 mm. long, greenish yellow; very young capsule narrowly ovate, mature capsule unknown.

Type from Jamaica, without definite locality, Macfadyen (Hooker Herb. at Kew, not seen).

Specimens examined.—JAMAICA: vicinity Morce's Gap, 1,500 m., *Maxon* 2772 (US). Road to St. Georges, *W. Harris* 7718 (F). Near Vinegar Hill, *W. Harris* 6048 (F), *W. Harris* 5353 (US).

Macrocarpaea thamnoides is evidently an endemic of Jamaica. Its closest relative is either *Macrocarpaea glabra* or the other Colombian species, *M. macrophylla.* The shape of the lower stem leaves of *Macrocarpaea thamnoides* is distinctive in the genus.

When describing *Lisianthus thamnoides* in 1864 Grisebach included "Cuba" within the geographic range of the species. Subsequently Grisebach indicated *Charles Wright* 1347 as the collection which constituted the basis of the Cuban record.[19] I have examined a sheet of *Wright* 1347, from "prope villam *Monte Verde* dictam, Cuba, Orientali," July 9, 1859 (GH), and find that it is much nearer the endemic species of the Dominican Republic, *Macrocarpaea domingensis*, than it is to *M. thamnoides* of Jamaica. Taxonomically the

[19] Cat. Pl. Cub. 180. 1896.

two species are quite unrelated but it is consistent with evidence from other plant genera to find the Cuban plant more closely related to the plant of the Dominican Republic than to that of Jamaica. Morphologically, the Cuban plant, as represented solely by one sheet of *Wright* 1347, suggests a distinct species. The leaves are more acute than those of *M. domingensis*, while corollas are narrowly campanulate, with short lobes about one-fourth as long as the tube, the tube constricted above the narrow-cupulate calyx. The stamens are evidently exserted.

23. **Macrocarpaea micrantha** Gilg, Bot. Jahrb. **22**: 338. 1896.
Macrocarpaea weberbaueri Gilg, Repert. Sp. Nov. Fedde **2**: 54. 1906. Type from vic. Moyobamba, 1,000–1,100 m., Dept. Loreto, Peru, *Weberbauer* 4655.

Slender shrub 2 m. high; stems thin, slender, terete or very faintly flattened, dark-green, glabrous but finely roughened, the upper internodes short; leaves ovate or lanceolate, acuminate, thin, 11–21 cm. long, 4. 5–9 cm. wide, acute at the base, with a slender petiole, 2–3.5 cm. long, amphiglabrous or with a very few hairs along midrib beneath; panicle often simple, few (7 to 12 or more)–flowered and somewhat compactly branching, sparsely leafy-bracteate; flowers small, greenish-yellow; calyx short-campanulate, 7–9 mm. long, muriculate or finely corrugate, the lobes bluntly rounded, finely erosulate, hyaline-margined, overlapping; corolla slender campanulate, 21–28 mm. long, the lobes ovate, 6–7 mm. long, obtuse, crispulate; capsule slender, fusiform at maturity, 3.0–3.5 cm. long, tapering to a slender style, finely and densely corrugate; mature (?) seeds minute, 0.5 mm. long, yellowish, finely alveolate.

Type from Tarapoto, Dept. of San Martín, Peru, 374 m., *R. Spruce* 4618 (isotype, G; photos of isotypes at Geneva [Field Mus. photo 26829] and Copenhagen [Field Mus. photo 22741]).

Richard Spruce gives an account of the Tarapoto country of eastern Peru, where he collected the type, and of its vegetation in general, in the second chapter of his "Notes of a Botanist on the Amazon and Andes," edited by A. R. Wallace, 1908.

A slender species sharing none of the robust woody characters of the genus as a whole, *Macrocarpaea micrantha* is evidently a little-collected forest species of Amazonian Peru. *Macrocarpaea weberbaueri*, from the same region as *M. micrantha*, judging from the description, is indistinguishable. Gilg related *Macrocarpaea weberbaueri* to *M. revoluta* though it can hardly have an affinity with that species.

A paratype of *Macrocarpaea weberbaueri*, which likewise I have not seen, is *Weberbauer* 5006, from Hacienda Idma, 1,500–1,800 m., Dept. Cuzco, Prov. Convención, Peru. This locality is somewhat above the altitude of the Tarapoto and Moyobamba localities; this collection may prove not to be conspecific.

Specimen examined.—PERU: Loreto: Pumayacu, 600–1,200 m., *Klug* 3138 (F, GH, MO, US).

24. **Macrocarpaea duquei** C. Gilg, Notizbl. **13:** 382. 1936.

Tall shrub or slender tree 3–5 m. high, the branches subterete, the internodes more or less elongated, subglabrous, scabrellous up to the glandular cano-hirtellous pedicels; leaves thick, rather firm when fresh, somewhat reduced above, the blades obovate or oval, rounded at the apex, 15–18 (or midcauline 30) cm. long, 9–13 cm. wide, subglabrous, more or less lustrous above, narrowed at the base to an indistinct, amplexicaulous petiole, this stout, winged-subauriculate, the veins rather prominent, especially beneath, reticulate, tomentellous beneath, the secondaries curving forward and all running along the margin to anastomose at the tip; panicle ample, compound, 15–30 cm. long, of several glomerate cymules of 4–6 or more flowers, all distinctly pedicellate, and with long-pedunculate lateral cymules; flowers spreading or erect in anthesis, very large, showy, the calyx deep-campanulate, 11–15 mm. long, the calyx-lobes rounded, 2–4 mm. long, hyaline-scarious on the margins, very finely ciliolate; corolla turbinate-campanulate, fleshy, clear cream-yellow, 50–75 mm. long, the lobes triangular-ovate, acute, 12–20 mm. long, 12–23 mm. wide at the base; stamens mostly about equaling the sinuses of the corolla but strongly reflexed; style thick, barely if at all exserted, the stigma bilamellate-clavate; immature capsule little exserted from the indurated calyx, quickly tapering to a slender style; seeds unknown.

Type formerly in the Herbarium of the Berlin Botanic Gardens, collected in the vicinity of Socorro Mines, Río Cali drainage, in the Cordillera Occidental, Department of Valle del Cauca, Colombia, at 2,900 m. elevation, August 30, 1936, by *J. M. Duque-Jaramillo* (No. 2).

Collections studied.—COLOMBIA: Dept. Valle del Cauca: Quebrada de Las Nieves, lomas parameras sobre la mina El Diamante, 3,000–3,120 m., Los Farallones, Cord. Occ., *J. Cuatrecasas* 21824 (US); Los Farallones, extremo N., vertiente oriental, Alto del Buey, bosques, 3,450–3,300 m., Cord. Occ., *J. Cuatrecasas* 18077 (US).

Macrocarpaea duquei is one of the most striking species in the genus and at once suggests the handsome Bolivian genus *Rusbyanthus* for its fine flowers. It is perhaps most closely related to *Macrocarpaea macrophylla*, from which its large flowers readily distinguish it. In its thick, rounded, obovate leaf-blades this species suggests the section *Magnoliifoliae*, but the internodes are not at all short, quadrangular, or vertebralike. Of all the Colombian species known to me at present, *Macrocarpaea duquei* stands more nearly midway between the two sections *Magnoliifoliae* and *Tabacifoliae*. It is possible that the origin of the herbaceous section *Tabacifoliae* from the ligneous section *Magno-*

liifoliae, suggested on morphological grounds of flower structure, may have come about through such species as *Macrocarpaea duquei*.

The two Cuatrecasas collections cited are unequal in the size of their corollas, yet I am confident they are conspecific.

25. **Macrocarpaea corymbosa** (R. & P.) Ewan, comb. nov.

Lisianthus corymbosus R. & P. Fl. Peruv. Chile **2**: 14, pl. 124. 1799.

Slender shrub up to 4 m. high, the branchlets all glabrous, lightly grooved above, straw-colored, the uppermost subterete with long internodes; leaves distant, all thin-membranous, amphiglabrous, the lower lanceolate, acute at base and apex, 18 cm. long, 9 cm. wide, rather strongly veined beneath, the petioles slender, 2 cm. long, the upper subrotund, abruptly short-acute, 9–10 cm. long, subsessile, the uppermost floral reduced but similar; panicle ample, glabrous, leafy-bracteate, branching below with long-pedunculate 5- to 7-flowered cymules, the terminal portion loosely branching; calyx short-campanulate, acute at the base, 10–11 mm. long, the lobes orbicular or nearly so, conspicuously overlapping, pale-hyaline-margined, finely crisped; corolla greenish yellow, dilated just above the calyx into a narrowly campanulate tube, 30–42 mm. long, the lobes oblong, finely crisped, pale-hyaline; capsule narrow-oblong, 4.0–4.5 cm. long at maturity, mucronate after falling of persistent slender style, muriculate; seeds minute, about 1 mm. long, including the irregularly lacerate wing.

Type from "Peruviae nemoribus inter Acomayo et Chinchao ad Pati praedium," *Ruiz & Pavón* [or *Dombey?*] (authentic material, F).

Specimen examined.—Peru: Dept. Cuzco: Lares Valley between Huallhuayoj and Calca, 1,900–2,000 m., *Weberbauer* 7921 (F).

When Ruiz and Pavón published *Lisianthus corymbosus* in 1799 they described fairly accurately the Peruvian plant that Ruiz records having collected in the vicinity of Chinchao.[20] At that time they illustrated their species with a plate (*pl. 124*) that fairly represented the Peruvian plant, judged from the few collections at hand. This *Lisianthus corymbosus* had been illustrated nine years earlier when James Edward Smith published a plate under the name "*Lisianthus glaber*."[21] Smith gave the source of his "*Lisianthus glaber*" as "in America meridionali legit Mutis," and, accordingly, it seems clear from his annotation of the plate, "omnia ex castigatione icone Mutisiana" (all [details] from corrected plate of Mutis), that Smith took the unpublished Mutis plate of the plant as known from Bogotá region and made such corrections as he believed warranted. Perhaps Smith had before him another *Macrocarpaea*, possibly from Peru, which he believed conspecific with the plant Mutis intended to illustrate. I have not seen

[20] *Cf.* Relación del Viaje, Chap. 2.

[21] J. E. Smith, Icon. Pl. Rar. **2**: *pl. 29.* 1790.

the Mutis plate in the Library of Linnean Society of London, but authentic material of *Lisianthus glaber*, brought to the United States National Herbarium from Madrid, has been available. Certainly the details as "corrected" by Smith are not confirmed by this material. Smith's plate shows a plant with petiolate leaves, acute corolla lobes, and a prismatic character in the unopened flower buds—three points unconfirmed by the Bogotá plant and, though not in perfect agreement with the Peruvian material, much more closely illustrative of the collections from Peru. In any event, Ruiz and Pavón correctly distinguished two species of *Macrocarpaea*.

The basis of Smith's error cannot be checked at present but, in any event, it has misled botanists, first Grisebach, then Gilg, in their interpretation of *Lisianthus corymbosus*. Both Grisebach and Gilg misconstrued *Lisianthus corymbosus* R. & P. to be a synonym of *L. glaber*. It would seem that both Grisebach and Gilg placed more importance upon the corrections made by Smith in the original unpublished Mutis plate than upon a comparative study of the Bogotá and Peruvian collections, failing to realize the separate sources of the plants described in turn by Linnaeus filius and by Ruiz and Pavón. That Grisebach should have made this mistake is all the more curious in that he records having examined both a Humboldt and Bonpland collection from the vicinity of "Santa Fé [de Bogotá]", Colombia, and an isotype of the Peruvian *Lisianthus corymbosus*. Nevertheless, modern collections of the two Macrocarpaeas involved show the plants of Colombia and Peru to be distinct.

26. **Macrocarpaea macrophylla** (H. B. K.) Gilg in Engler, Pflanzenfam. 4^{2}: 94. 1895. *Lisianthus macrophyllus* H. B. K. Nov. Gen. & Sp. **3**: 183. 1819.[22]

Slender arborescent shrub 2.5–5 or 8 m. high, the stem simple or branching sparingly only above, terete or with longitudinal lesionlike grooves, puberulent above, subglabrous below; leaves large, broadly ovate, the uppermost suborbicular, rather abruptly acute to a subsessile base, 25–30 cm. long, 15–20 cm. wide, glabrous above, soft puberulent beneath, especially along the nerves; panicle ample, elongate, 25–35 cm. or more long, with 2–3 or more pairs of laterals, leafy bracteate, the cymules loosely many-flowered; calyx campanulate, 10–12 mm. long, the lobes obtuse to truncate or nearly so, without a well-defined scarious margin; corolla narrow-campanulate to salver-shaped, 30–35 mm. long, cream-color or greenish, the lobes ovate, or shortly deltoid ovate, 7–8 mm. long; capsule ovoid, 21–24 mm. long, the style early deciduous to leave an acute tip; seeds prismatic-oblong, 0.5 mm. long, microscopically foveolate, light-brown.

[22] Date *fide* Sherborn and Woodward, Journ. Bot. Brit. & For. **39**: 203. 1901, but *cf.* also J. H. Barnhart, Bull. Torrey Club **29**: 585. 1902.

Type from trail over paramillo to Almaguer between Pansitara and Río Ruiz, 8,400 feet, Colombia, *Humboldt & Bonpland* (Willd. Herb. No. 3561 *fide* Grisebach; Field Mus. photo 37455, of collection in Humboldt Herbarium at Paris). On modern maps this is a ridge of the Eastern Cordillera lying to the north of Almaguer in the Departamento del Cauca.

Specimens examined.—COLOMBIA: Santander: 15 km. west of Bolívar, 30 km. northwest of Velez, 6,900 feet, *Fassett* 25120 (USNA). Antioquia: La Sierra near Medellín, 2,000 m., *Archer* 1088 (US); Santa Elena, *Archer* 1276 (US); Alto Capiro above Sonsón, *Ewan* 15765 (USNA); La Ceja, *Daniel* 964 (US). Caldas: San Clemente, Cord. Occidental, *Pennell* 10670 (PH). Tolima: Ibagué, *André* K1379 (F); Quindío, *André* 2359 (F). El Valle: San Antonio, west of Cali, Cord. Occidental, *Killip & García* 33650 (US); Cordillera above Cali, 2,000 m., *F. C. Lehmann* 3029 (US); Inza, *Lehmann* 6626 (US); Cuesta de Tocotá, 1500–1900 m., *Pittier* 726 (US). Huila-Caquetá border: Gabinete, 2,300–2,450 m., *Cuatrecasas* 8435 (US).

This *Macrocarpaea*, the most common species in the Central and Western Cordilleras of Colombia, is called "tabaquillo" (or "tavaquillo") in the Departments of Caldas and Antioquia. Brother Daniel says that the plant common about Santa Elena, Antioquia, which has been mistakenly identified as "*Macrocarpaea polyantha* Gilg" (confined to the Eastern Cordillera), is known as "tabaquillo del monte."

27. **Macrocarpaea valerii** Standl., Field Mus. Bot. 18: 928. 1938.

Tall herb or subshrub about 2 m. high, freely branching, the branches nearly quadrangular, bracteate throughout, the internodes often elongated, glabrous or nearly so throughout; leaves thin, reduced above, all petiolate, the petioles 1.5–4 cm. long, connate-amplexicaulous, the blades orbicular to lance-ovate, more or less truncate at the apex, abruptly acuminate, those of the principal leaves ovate, 15–25 cm. long, 12–16 cm. wide, venose, the secondaries curving forward and the lowest running along the margin to all merge at the tip; panicle open, diffuse, 20–30 cm. long consisting of several loose cymules of 6–10 flowers, all distinctly pedicellate, and with long-pedunculate lateral cymules; flowers erect in anthesis, early recurving, the calyx cupulate to deep-campanulate, 11–12 mm. long, divided almost halfway to base into oblong rounded or obtuse lobes each ca. 5 mm. long, hyaline-scarious on the margins; corolla flaring-campanulate, fleshy, cream-yellow, 25–35 mm. long, the lobes oblong-ovate, acute, spreading, 9–10 mm. long, 8–10 mm. wide at the base; stamens about equaling sinuses of corolla but recoiled; style thick, included, the stigma clavate-thickened; capsule little exserted from indurated calyx, tapering to a slender style; seeds ovate, flattened, about 0.7 mm. long, light yellow.

Type in the Herbarium of the Chicago Natural History Museum, No. 681824, collected in the vicinity of La Hondura de San José, Costa Rica, at 1,300 m. elevation, August 15, 1933, by *Manuel Valerio* (No. 692).

Specimens examined.—Costa Rica: Alajuela: La Peña de Zarcero, Cantón Alfaro Ruiz, 1675 m., 30 VII 1938, *Austin Smith* 1001 (F).

Macrocarpaea valerii is most closely related to *M. macrophylla* of Colombia. The strongly veined leaves, with their abruptly acuminate tips, and the large open-campanulate corollas of *M. valerii* are distinctive.

The collection from "Vallee du Rancho Redondo, alt. 1800 m. Avr. 1889," *Pittier* 1153, referred to *Lisianthus thamnoides* by John Donnell Smith,[23] and by inference to *Macrocarpaea valerii* by Standley, has not been located, but I suggest that it may prove, rather, to be the rare *M. subcaudata.*

28. **Macrocarpaea pachystyla** Gilg, Bot. Jahrb. Engler 22: 336. 1896.

Slender arborescent shrub about 2 m. high, the branchlets stout, terete, glabrous, faintly longitudinally striate, leafy above; leaves of two sorts: the principal cauline broadly ovate, acute, distinctly petiolate, the petioles grooved, 2 cm. long, the upper floral leaves oblong-ovate or suborbicular, abruptly narrowed to a connate-clasping base, all thin-membranous, amphiglabrous, paler and glaucous beneath, the secondary veins prominent; panicle loose, leafy-bracteate, of 3–5 few-flowered cymules, the flowers borne on stout pedicels; calyx broad at base, campanulate or goblet-shaped, 15–20 mm. long, 8–14 mm. broad, the lobes broadly ovate, pale-scarious and erosulate-margined, overlapping; corolla showy, yellow-green, turbinate-campanulate, 4 to "5–5.5" cm. long, flaring below the ovate-subrotund lobes; capsule shortly flask-shaped, tapering to a thick persistent style; mature seeds not seen.

Type from Chicoplaya, 26 leagues north of Huánuco, Dept. Huánuco, Peru, *Ruiz & Pavón* (authentic fragment, F; Field Mus. photo 29361).

Specimen examined.—Peru: Puno: Near Sagrario, Prov. Sandía, 1,000–1,300 m., *Metcalf* 30629 (US).

R. D. Metcalf, of the Third University of California Botanical Garden Expedition to the Andes, recorded its habitat as "moist open places on stream bank, much fog and rain." The species is apparently infrequent, judged from the few collections preserved in herbaria.

The large showy carollas suggest the genus *Rusbyanthus* but the leaf shape and size, as well as the calyx and capsule characters, are quite different.

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[23] In Pittier, Prim. Fl. Costar. 2: 167. 1898.

29. **Macrocarpaea viscosa** (R. & P.) Gilg, Bot. Jahrb. Engler 22: 337. 1896.
Lisianthus viscosus R. & P. Fl. Peruv. Chile 2: 14, *pl. 125*. 1799.

Slender shrub or small tree 1.5–3 m. high, the branchlets stout, subterete or distinctly angled, glabrous below, glandular-puberulent in the inflorescence; leaves ovate or oval, acute at tip, narrowed at the base into a short but distinct stout petiole, glabrous above, more or less glaucous and puberulent along the veins beneath, 15–20 cm. long, 9–14 cm. wide, thin, venose; panicle broadly corymbose, consisting of 3–5 laterally disposed congested cymules of 6–12 flowers; flowers showy, waxy cream-white, greenish tinged in bud; calyx proportionately small, rounded or subacute at base, campanulate, glandular puberulent on tube, the lobes ovate, rounded, 1.5–2 mm. long, subglabrous, erosulate; corolla open-campanulate, rather uniformly flaring from the constricted base, 4–5 cm. long, the lobes broadly ovate, erect, 11–16 mm. long, only narrowly overlapping; capsule slender, 30–35 mm. long, long-attenuate to the short beaklike persistent style.

Type from "altis locis," from Muña to Tambo Nuevo, Pachitea, Peru, *Ruiz & Pavón* (Field Mus. photo 29362).

Specimens examined.—PERU: Cuzco: Choquellohuanca, Lucumayo, 1,700 m., *C. Vargas* 4196 (US). Huánuco: Carpish, 2,850 m., *Stork & Horton* 9913. Cajamarca: 10 km. northwest of Socota, 3,200 m. *Stork & Horton* 10118 (USNA).

Growing along margins of montaña, *Macrocarpaea viscosa*, as here understood, is a showy flowered shrub with a broad flattened panicle which bears short lateral peduncles and lacks the lower elongated naked branchlets so often characteristic of the genus. The leaves are venose above, as well as below, but oval rather than "oblonga" as given in the original description. In short, the modern collections cited above do not agree well in leaf shape and apparent texture with the original illustration (*pl. 125*). The very viscid calyx is, moreover, not evident in these modern collections.

The sheet of *Macbride* 5224, collected at La Merced, northeast of Tarma, Dept. Junín, Peru, in the United States National Herbarium is *Macrocarpaea viscosa*, but the same number in the Herbarium of the Chicago Natural History Museum is *M. revoluta*.

The following paragraph may represent a record of the time and place of the collecting of the type of this species:

> On the 15th [July, 1784] we left Muña, and we passed the night three leagues from there in a small clearing called Tambo Nuevo which, although cold and filled with water by the frequent showers that fall there almost daily, so abounds with ichu [*Stipa ichu*] that the muleteers stopped, in spite of the dense and damp fog, to let the animals graze on that grass and rest, so as to be able to continue the ascent of this elevated hill, for at the summit there are no trees nor any other larger plants except a species [better translated, a kind] of *Stereoxylum corymbosum*, known there by the name of Suiba. These small trees

grow to be eight or ten yards tall; their trunk and branches are so covered with black mosses and lichens that they appear like trees singed and clad in mourning. They have the property of burning so badly and emitting so much smoke that no one can get warm by their fire or endure the nuisance of the dense smoke. (Travels of Ruiz, Pavón, and Dombey in Peru and Chile, 1777–1788 by Hipólito Ruiz, translated by B. E. Dahlgren, Publ. Field Mus. Bot. 21: 170. 1940.)

That this was the occasion of the collecting of the type specimen of *Lisianthus viscosus* R. & P. is not improbable. Muña will be found to be almost due east of Huánuco at latitude 10° S., and the puña that Ruiz crossed lies between the drainages of the Río Huallaga and the Río Pozuzo.

30. **Macrocarpaea sodiroana** Gilg, Bot. Jahrb. Engler 25: 724. 1898.

Herbaceous shrub to small tree 1–4 or 10 m. high with slender, glabrous, nearly terete branchlets, the internodes elongate; principal cauline leaves ample, ovate or lance-ovate, amphiglabrous, thin-membranous, 25–30 cm. long, 14–15 cm. wide, cuneate at the base, dark green above, paler green beneath and more or less glaucous, the secondary veins strongly ascending, percurrent and nearly parallel to margin above, the petioles slender, 3–4 cm. long, the uppermost floral leaves reduced but similar; panicle diffuse, leafy-bracteate, the lower branchlets elongate, terminating in rather dense cymules of 3–7 distinctly pedicellate flowers; calyx short-campanulate or cupulate, glabrous, 8–10 mm. long, the lobes low-rounded or subtruncate, hyaline-scarious, erosulate, weakly overlapping; corolla greenish-yellow, campanulate, 30–38 mm. long, the lobes ovate or ovate-oblong, acute, about 1 cm. long, crispulate; immature capsule elongate-pyriform, 2.5 cm. long, attenuate to the persistent subfiliform style; seeds unknown.

Type from "regione temperata secus Río Pilatón," 800–1,600 m., southwest of Quito, Prov. Pichincha, Ecuador, *Sodiro* 101/1.

Specimens examined.—ECUADOR: Prov. Napo-Pastaza: Río Negro, between Baños and Mera, 400–500 m., *Mexia* 6977 (US, USNA). Prov. Santiago-Zamora: Río Tintas below Arenillas, ca. 2,200 m., *Steyermark* 53548 (F, US). Prov. Loja: Río Cachiyacu, western slopes of Cord. de Condor and northwest slopes of Nudo de Sabanillas, 2,000–3,000 m., *Steyermark* 54812 (F); Namanda, southern Loja, 2,400–2,500 m., *R. Espinosa* 198 (US).

Macrocarpaea sodiroana is most closely related to *M. macrophylla* of Colombia but may be distinguished by the broadly cuneate-based, long-petiolate leaves and the prominent percurrent venation. Ynes Mexia reported it as occasional in dense forests near the Río Negro in the Province of Napo-Pastaza.

DOUBTFUL SPECIES

1. **Macrocarpaea glaziovii** Gilg, Bot. Jahrb. Engler 22: 335. 1897. Type from "Rio de Janeiro (?), Brazil, *Glaziou* (a. 1872) n. 4939."

The description suggests *Macrocarpaea rubra* Malme, but the corolla lobes, as described by Malme, are much too long. Evidently Malme had studied the Glaziou collection in question. The other distinctions drawn by him, namely, the fewer secondary nerves, longer pedicels, and shorter campanulate-urceolate corollas, are well within the expected variation of *M. rubra* upon the basis of the 14 sheets studied of that species. In the event the two collections prove to be conspecific, *M. rubra* Malme must yield to *M. glaziovii* Gilg as the older valid name. It is curious, however, that Gilg did not mention the reddish corollas if the Glaziou plant is the same as *M. rubra* Malme. It is probable that the Glaziou type was taken, not in the vicinity of Rio de Janeiro, but in southern Brazil. I have been unable to discover that Glaziou made any extended collections in 1872; in any event, Urban, in his itinerary of Glaziou in the Flora Brasiliensis, mentions none.

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UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 29, PART 6

NEW GRASSES FROM HONDURAS COLOMBIA, VENEZUELA, ECUADOR BOLIVIA, AND BRAZIL

By JASON R. SWALLEN

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BULLETIN OF THE UNITED STATES NATIONAL MUSEUM

PREFACE

In the present paper, by Jason R. Swallen, curator of the division of grasses, United States National Herbarium, 34 new species of grasses are described. They are based mainly on recent collections from countries of tropical America, the types being deposited in the National Herbarium.

E. P. Killip,
Head Curator, Department of Botany,
United States National Museum.

NEW GRASSES FROM HONDURAS, COLOMBIA, VENEZUELA, ECUADOR, BOLIVIA, AND BRAZIL

By Jason R. Swallen

The new species described herein are mostly from the collections of recent years of Julian A. Steyermark in Venezuela and Ecuador, E. P. Killip and J. Cuatrecasas in Colombia, Juvenal Valerio Rodríguez in Honduras, and those of the author in Brazil. The others were collected by Agnes Chase and H. Pittier in Venezuela, M. Acosta Solis and Reinaldo Espinosa in Ecuador, P. Dusén and Ricardo de Lemos Fróes in Brazil, H. Karsten in Colombia, and M. Cárdenas in Bolivia.

CORTADERIA PUNGENS Swallen, sp. nov.

Perennis; culmi dense caespitosi, erecti, 27–35 cm. alti, 3 nodosi; folia inferiora basi culmorum aggregata, vaginis glabris, fibrosis, laminis erectis, firmis, pungentibus, complicatis, 10–20 cm. longis, supra basin dense pubescentibus, marginibus scaberrimis basi ciliatis; culmorum vaginae elongatae, internodiis longiores; ligula ciliata 1.5 mm. longa; laminae 3–6 cm. longae; panicula 8–9 cm. longa, erecta, angusta, densa, axe et ramis dense pilosa, pilis appressis; glumae 12–15 mm. longae, aurea et purpurascentes, lemma 5–6.5 mm. longum, bilobatum, lobis obtusis vel subacutis, aristatis, aristis 1–2 mm. longis, inter lobos aristatum, arista 8–11 mm. longa, geniculata, basi plana, tortuosa; palea obovato-elliptica, lemmate brevior, inter carinas pubescens, carinis scabro-ciliata, apice angusto, truncato, minute ciliato.

Perennial; culms densely tufted, erect, 27–35 cm. tall, 3-noded; basal leaves forming a dense cluster at the base of the culms, the sheaths crowded, glabrous, becoming fibrous with age, the blades erect, firm, pungent, tightly folded, 10–20 cm. long, densely pubescent on the upper surface at the base, the margins very scabrous, densely ciliate at the base; culm sheaths elongate, longer than the internodes, the uppermost reaching the base of the panicle; ligule a dense line of hairs 1.5 mm. long; blades 3–6 cm. long; panicle 8–9 cm. long, erect, narrow, rather dense, the axis and branches densely hairy, the hairs appressed; glumes mostly 12–15 mm. long, acuminate, golden tinged with purple; lemma 5–6.5 mm. long, deeply bilobed, awned from between the lobes, the awn 8–11 mm. long, flattened and rather broad at the base, somewhat twisted and geniculate spreading, the lobes obtusish or subacute, awned, the awns 1–2 mm. long; palea

obovate-elliptic, shorter than the lemma, pubescent between the scabrous-ciliate keels, the tip narrow, truncate, minutely ciliate.

Type in the U. S. National Herbarium, No. 1353059, collected on Páramo de Santurbán, near Vetas, Department of Santander, Colombia, altitude 3,950–4,160 meters, January 17, 1927, by E. P. Killip and Albert C. Smith (No. 17467).

CORTADERIA SCABRIFLORA Swallen, sp. nov.

Perennis; culmi dense caespitosi, ca. 1 m. alti (?), laminis basi dense aggregatis; culmi vaginae latae, glabrae, summo marginibus ciliata; ligula ciliata, 1 mm. longa; laminae usque ad 55 cm. longae, 8 mm. latae, basi incurvatae, subtus glabrae, supra basi dense pubescentes, marginibus scaberrimae basi ciliatissimae; panicula 25 cm. longa, 4 cm. lata, densa, ramis appressis, hirsutis et sparse vel dense pilosis; spiculae hermaphroditae; glumae subaequales, 14–16 mm. longae, acuminatae, aureae et purpurascentes, nervo prominente; lemma infimum 7 mm. longum, scabrum, in parte inferiore sparse pilosum, pilis usque ad 4 mm. longis, minute bilobatum, lobis aristatis aristis 3 mm. longis, inter lobas aristatum, arista 6–9 mm. longa, scabra, basi plana; callus 0.5 mm. longus, dense barbatus, pilis 1.5 mm. longis; palea lemma aequans, apice truncata minute ciliata, carinis minute scabra; antherae 3 mm. longae.

Densely tufted perennial; leaves mostly crowded in a dense basal cluster, hard and firm; culm sheaths broad, rounded, rather loose, straw-colored, glabrous, the margins more or less ciliate toward the summit; ligule a dense rim of hairs 1 mm. long; blades as much as 55 cm. long, 8 mm. wide, incurved at the base, becoming flat above, glabrous beneath, densely pubescent above near the base, the margins very scabrous rather conspicuously ciliate at the base; panicle 25 cm. long, about 4 cm. wide, rather dense, the branches appressed, hirsute and also sparsely to rather densely hairy; spikelets perfect; glumes subequal, 14–16 mm. long, relatively firm, acuminate, golden, tinged with purple, the nerve rather strong and prominent; lowest lemma 7 mm. long, scabrous, sparsely covered with long white spreading hairs on the lower half, the hairs as much as 4 mm. long, the tip shallowly lobed, awned from between the lobes, the awn 6–9 mm. long, scabrous, somewhat flattened toward the base, the lobes awned, the awns 3 mm. long, the callus about 0.5 mm. long, densely bearded, the hairs 1.5 mm. long; rachilla joint glabrous; palea as long as the lemma, the narrow tip truncate, minutely ciliate, the keels minutely scabrous; anthers 3 mm. long.

Type in the U. S. National Herbarium, No. 1911636, collected along lakeshore, on paramos, in vicinity of Toreador, between Molleturo and Quinoas, Province of Azuay, Ecuador, altitude 3,810–3,930 meters, June 15, 1943, by Julian A. Steyermark (No. 53188).

CORTADERIA PARVIFLORA Swallen, sp. nov.

Perennis; culmi dense caespitosi, erecti, 60 cm. alti, infra paniculam pubescentes; folia basi culmorum aggregata, vaginibus senescentibus fibrosis, tortuosis; vaginae internodiis longiores, inferiores breves, glabrae, laminis elongatis, eae culmorum elongatae, laminis reductis; ligula dense ciliata, 0.5–1 mm. longa; laminae usque ad 60 cm. longae, 2–3 mm. latae supra basin pubescentes, marginibus scaberrimae basi ciliatae; paniculae 12–15 cm. longae, 1–2 cm. latae, ramis adscendentibus vel appressis, inferioribus 3–4 cm. longis, basi nudis; spiculae hermaphroditae, 3-florae; glumae 5–6 mm. longae, 0.5–0.6 mm. latae, tenues, acutae, aureae; lemma infimum 7 mm. longum, acuminatum, bifidum, dentibus 0.5 mm. longis, acutis, exaristatis, in parte inferiore pilosum, pilis 4–5 mm. longis, inter dentes aristatum, arista recta, 4–5 mm. longa; palea 3.5 mm. longa, lemmate multo brevior, glabra, carinis scabro-ciliata.

Perennial; culms densely tufted, erect, 60 cm. tall, pubescent below the panicles; leaves mostly crowded toward the base, the old lower sheaths becoming fibrous and much curled; sheaths longer than the internodes, the lower ones short, glabrous, loose, with elongate blades, those of the culm elongate with much reduced blades; ligule a dense rim of hairs 0.5–1 mm. long; blades as much as 60 cm. long, 2–3 mm. wide, pubescent on the upper surface at the base, the margins strongly scabrous, ciliate at the base; panicles 12–15 cm. long, 1–2 cm. wide, the branches ascending or appressed, the lower ones 3–4 cm. long, naked at the base; spikelets 3-flowered, the florets perfect; glumes 5–6 mm. long, 0.5–0.6 mm. wide, thin, acute, golden; lowest lemma 7 mm. long, acuminate, bifid, the teeth about 0.5 mm. long, acute, awnless, villous on the lower part of the back, the hairs ascending, 4–5 mm. long, awned from between the teeth, the awn straight, 4–5 mm. long; palea 3.5 mm. long, much shorter than the lemma, glabrous, the keels scabrous-ciliate.

Type in the U. S. National Herbarium, No. 1912278, collected in meadow, between La Trampa and Casadero, along tributary of Quebrada del Salado, State of Mérida, Venezuela, altitude 2,225–2,590 meters, April 28, 1944, by Julian A. Steyermark (No. 56182).

CORTADERIA PLANIFOLIA Swallen, sp. nov.

Perennis; culmi dense caespitosi, erecti, 35–55 cm. alti; vaginae inferiores breves, condensatae, glabrae, eae culmorum elongatae internodiis breviores, glabrae, suprema lamina reducta vel nulla; ligula ciliata, 0.5 mm. longa; laminae planae, erectae firmae, 8–12 cm. longae, 2–4 mm. latae, supra scaberulae, marginibus scaberrimae; paniculae 10 cm. longae, pauciflorae, ramis subremotis, adscendentibus scabris, inferioribus ca. 6 cm. longis; glumae 8–10 mm. longae, acumi-

natae, exaristatae; lemma 7 mm. longum, angustum, acuminatum, arista recta 7 mm. longa, in parte inferiore pilosum, pilis adscendentibus 4 mm. longis; callus 1 mm. longus, barbatus, pilis usque ad 1.5 mm. longis; palea 4.5 mm. longa, scabra, carinis minute scabra-ciliata.

Perennial; culms densely tufted, erect, 35–55 cm. tall; innovations numerous, crowded, the sheaths short, overlapping, glabrous; culm sheaths elongate, mostly shorter than the internodes, glabrous, the upper one with much reduced blade or bladeless; ligule ciliate, 0.5 mm. long; blades flat, erect, firm, 8–12 cm. long, 2–4 mm. wide, scaberulous above, the margins strongly scabrous; panicles 10 cm. long, few-flowered, the lower rather distant, scabrous branches ascending, about 6 cm. long; glumes 8–10 mm. long, acuminate, awnless; lemma 7 mm. long, narrow, gradually narrowed into an awn 6 mm. long, the tip entire, hairy on the lower part of the back, the hairs ascending, 4 mm. long, the callus 1 mm. long, densely hairy, the hairs as much as 1.5 mm. long; palea 4.5 mm. long, scabrous, the keels minutely scabrous-ciliate.

Type in the U. S. National Herbarium, No. 1854213, collected at "Los Farallones, extremo N., vertiente NW, entre Alto del Buey y Quebrada de los Ramos," Cordillera Occidental, Department of El Valle, Colombia, altitude 3,450–3,350 meters, October 12, 1944, by J. Cuatrecasas (No. 18059).

FESTUCA RECLINATA Swallen, sp. nov.

Perennis; culmi elongati, decumbentes vel prostrati, ramosi; vaginae internodiis longiores, glabrae; ligula hyalina, lacerata, usque ad 2 mm. longa; laminae 7–10 cm. longae, 2–4 mm. latae, planae, tenues, glabrae vel nervo medio basi pubescentes; paniculae usque ad 4 cm. longae, usque ad 1 cm. latae, pauciflorae, ramis brevibus flexuosis; spiculae 8–9 mm. longae, 3–5-florae; glumae acutae vel acuminatae, prima 2–3 mm. longa, 1–3-nervis, secunda 3–4 mm. longa, 3-nervis, quam gluma prima latior; lemma primum 6.5 mm. longum, acuminatum, carina et nervis marginalibus scabrum, internerviis scaberulum, arista 1 mm. longa, scabra; palea bifida, lemmate brevior, carinis scabris; antherae 2.5 mm. longae.

Perennial; culms weak, decumbent spreading or prostrate, often branching; sheaths longer than the internodes, glabrous; ligule hyaline, lacerate, as much as 2 mm. long; blades mostly 7–10 cm. long, 2–4 mm. wide, acuminate, flat, soft, thin, glabrous, or somewhat pubescent on the midnerve on the upper surface toward the base; panicles as much as 4 cm. long, about 1 cm. wide, few-flowered, the axis and short branches flexuous; spikelets 8–9 mm. long, 3–5-flowered; glumes acute or acuminate, the first 2–3 mm. long, 1–3-nerved, the second 3–4 mm. long, 3-nerved, broader than the first; first lemma 6.5 mm. long, acuminate, distinctly scabrous on the keel and marginal nerves, somewhat

scabrous on the internerves, the awn about 1 mm. long, scabrous; palea bifid, shorter than the lemma, scabrous on the keels; anthers 2.5 mm. long.

Type in the U. S. National Herbarium, No. 1798714, collected on Páramo de Almorzadero, Cordillera Oriental, Department of Santander, Colombia, altitude, 3,500–3,700 meters, July 20, 1940, by J. Cuatrecasas and H. García Barriga (No. 9970).

FESTUCA PARCIFLORA Swallen, sp. nov.

Perennis; culmi erecti, basi decumbentes, 25–40 cm. alti; vaginae inferiores subaequales, lucidae, glabrae; ligula 1 mm. longa, firma, decurrens; laminae 10–12 cm. longae, involutae, in parte superiore arcuatae, sparse scabrae, suprema reducta; paniculae 4–11 cm. longae, angustissimae, ramis brevibus appressis 1–2-spiculatis; spiculae 2–3-flores, ca. 1 cm. longae; gluma prima 2.5–3 mm. longa, acuta, 1-nervis; gluma secunda 4 mm. longa, obtusa, 3-nervis; lemma acuminatum, 6.5–8 mm. longum, glabrum vel summo scabrum, aristatum, arista 0.5–1.5 mm. longa; palea acuminata lemmate paulo brevior.

Perennial; culms erect from a decumbent base, 25–40 cm. high, with 1 culm blade about the middle; basal sheaths subequal, smooth, shining; ligule 1 mm. long, firm, decurrent; blades mostly 10–12 cm. long, involute, firm, arcuate toward the tip, more or less scabrous, the culm blade much reduced; panicles 4–11 cm. long, very narrow, the short 1- or 2- flowered branches appressed; spikelets 2- or 3-flowered, about 1 cm. long; first glume 2.5–3 mm. long, acute, 1-nerved; second glume 4 mm. long, obtuse, 3-nerved; lemma acuminate, 6.5–8 mm. long including the awn 0.5–1.5 mm. long, glabrous, or scabrous toward the summit; palea acuminate, a little shorter than the lemma.

Type in the U. S. National Herbarium, No. 1911635, collected on paramos, in vicinity of Toreador, between Molleturo and Quinoas, Province Azuay, Ecuador, altitude 3,810–3,930 meters, June 15, 1943, by Julian A. Steyermark (No. 53092).

POA PETROSA Swallen, sp. nov.

Perennis; culmi graciles, caespitosi, erecti, 50 cm. alti. glabri, 2-nodos; vaginae compressae, carinatae, inferiores subequitantes 1–1.5 cm. longae, eae culmorum elongatae internodiis longiores vel breviores; ligula membranacea, acuta, 2 mm. longa; laminae conduplicatae, 4–8 cm. longae, 1.5–1.8 mm. latae, erectae, rectae vel falcatae, glabrae; panicula 8–10 cm. longa, ramis gracillimis, scabris, binis vel ternatis, flexuosis, in parte ¼ supremo floriferis; spiculae densae, 2-florae, ca. 3.8 mm. longae; glumae aequales, 3–3.5 mm. longae, carina scabrae, prima 1-nervis, seconda 3-nervis; lemma inferius 2.8–3.4 mm. longum, acutum, scabrum, basi sparse lanatum.

Perennial; culms tufted, slender, erect, about 50 cm. tall, 2-noded, glabrous; sheaths compressed-keeled, glabrous, the lower ones subequitant 1–1.5 cm. long, those of the culm elongate, longer or shorter than the internodes; ligule membranaceous, cute, 2 mm. long; blades conduplicate, 4–8 cm. long, 1.5–1.8 mm. wide as folded, erect, straight or falcate, glabrous; panicles long exserted, 8–10 cm. long, the very slender scarbrous branches in rather distant fascicles of 2 or 3, naked below, spikelet bearing in the upper fourth; spikelets clustered, 2-flowered, about 3.8 mm. long; glumes equal, 3–3.5 mm. long, scabrous on the keel, the first 1-nerved (or rarely faintly 3-nerved), the second a little wider, 3-nerved; lower lemma 2.8–3.4 mm. long, acute, scabrous, especially on the keel, webbed at the base, the web sometimes sparse but plainly evident.

Type in the U. S. National Herbarium, No. 1912270, collected on dry rocky gneissic-granitic slopes, between Timotes and Paramito, State of Mérida, Venezuela, altitude 2,285–3,500 meters, March 24, 1944, by Julian A. Steyermark (No. 55737).

TRISETUM FOLIOSUM Swallen, sp. nov.

Perennis; culmi caespitosi, erecti, 35 cm. alti, glabri; vaginae internodiis longiores, inferiores dense pubescentes, superiores glabrae; ligula hyalina, 3–4 mm. longa; laminae inferiores elongatae, 1.5 mm. latae, dense pubescentes, superiores, 7–11 cm. longae, 2–3 mm. latae, glabrae, marginibus ciliatis; panicula 14 cm. longa, 1.5 cm. lata, ramis appressis basi nudis, inferioribus usque ad 5.5 cm. longis; spiculae 7 mm. longae, 2-florae; gluma prima 5 mm. longa, acuminata, carino scabro-ciliata; gluma secunda 7 mm. longa, gluma prima duplo latior, acuminata, 3-nervis; lemma inferior 6 mm. longum, scabrum, lobis latis hyalinis 1 mm. longis; arista dorso medio inserta, 9 mm. longa, curvata; palea 4 mm. longa, carinis ciliata; rhachillae internodium 2 mm. longum, in parte superiore pilosum pilis 1 mm. longis.

Perennial; culms tufted, erect, 35 cm. tall, glabrous; sheaths all longer than the internodes, the lower ones densely pubescent, the upper ones glabrous; ligule hyaline, mostly 3–4 mm. long; lower blades elongate, about 1.5 mm. wide, densely pubescent, the upper blades 7–11 cm. long, 2–3 mm. wide, glabrous, the margins more or less ciliate; panicle 14 cm. long, about 1.5 cm. wide, dense but not spikelike, the branches appressed or narrowly ascending, naked at the base, the lower ones as much as 5.5 cm. long; spikelets 7 mm. long, 2-flowered, pale green tinged with purple; first glume 5 mm. long, 0.5 mm. wide from keel to margin, acuminate, scabrous-ciliate on the keel; second glume 7 mm. long, 1 mm. wide from keel to margin, rather abruptly narrowed to an acuminate tip, 3-nerved, the lateral nerves close to the keel; lower lemma 6 mm. long, scabrous, the lobes

of the broad hyaline tip 1 mm. long, irregularly toothed, the awn inserted at the middle of the back, 9 mm. long, curved, more or less laterally spreading, the callus very short or as much as 0.8 mm. long; palea about 4 mm. long, ciliate on the keels; rachilla joint between the florets 2 mm. long, hairy on the upper half, the hairs 1 mm. long.

Type in the U. S. National Herbarium, No. 1911640, collected on rocky slopes along stream above Laguna Mucubaji, toward Laguna Negra, State of Mérida, Venezuela, altitude 3,625–3,655 meters, July 21, 1944, by Julian A. Steyermark (No. 57482).

CALAMAGROSTIS KILLIPII Swallen, sp. nov.

Perennis; culmi caespitosi, erecti, 20–28 cm. alti; vaginae internodiis longiores, glabrae vel puberulae; ligula 0.8 mm. longa, minute erosa; laminae 6–15 cm. longae, involutae, erectae, firmae, supra scabrae, nervosae, infra glabrae, marginibus basi sparse ciliatae; paniculae 5–8 cm. longae, 8–12 mm. latae, densae, ramis brevibus appressis basi nudis; spiculae 6.5–7.5 mm. longae; glumae acuminatae, purpureae et aureae, apice hyalinae; lemma 5 mm. longum, bifidum, glabrum, costae medio aristatum, arista 7 mm. longa, geniculata, infra geniculam contorta; calli pili densi, lateralibus usque ad 1 mm. longis; rhachilla 3 mm. longa, dense pilosa, pilis superioribus longioribus, lemma aequantibus.

Perennial; culms tufted, erect, 20–28 cm. tall; sheaths all longer than the internodes, glabrous or puberulent; ligule 0.8 mm. long, minutely erose; blades firm, erect, involute, 6–15 cm. long, glabrous beneath, strongly nerved and scabrous above, more or less ciliate on the margins toward the base; panicle 5–8 cm. long, 8–12 mm. wide, dense, the short branches appressed, naked at the base; spikelets 6.5–7.5 mm. long; glumes acuminate, purple tinged with gold, the tip hyaline; lemma 5 mm. long, glabrous, deeply bifid, awned from the middle of the back, the awn 7 mm. long, geniculate, tightly twisted below the bend, the callus hairs rather dense, short on the back, as much as 1 mm. long on the sides; rachilla segment 3 mm. long, densely hairy, the hairs on the upper half longer, as long as the lemma.

Type in the U. S. National Herbarium, No. 1353058, collected on Páramo de Santurbán, near Vetas, Department of Santander, Colombia, altitude 3,950–4,160 meters, January 17, 1927, by E. P. Killip and Albert C. Smith (No. 17466).

CALAMAGROSTIS PISINNA Swallen, sp. nov.

Perennis; culmi erecti, caespitosi, 10–17 cm, alti; vaginae glabrae; ligula 1–2 mm. longa, truncata, hyalina; laminae 2–4 cm. longae, 1–2 mm. latae, planae, minute scabrae; paniculae 3–5 cm. longae, 1–1.5 cm. latae, vix laxae; spiculae 3.5–4 mm. longae; glumae subae-

quales, acutae vel sub-acuminatae, purpureae, carina sparse scabrae, prima 1– vel 3– nervis, secunda 3-nervis; lemma 3 mm. longum, 4-dentatum, costae medio aristatum, arista 6 mm. longa, geniculata, infra geniculam contorta; calli pili sparsi usque ad 0.5 mm. longi; rhachilla 1 mm. longa, dense pilosa, pilis lemma aequantibus; palea hyalina, lemmate paulo brevior, carinis glabris.

Perennial; culms tufted, erect, 10–17 cm. tall. the leaves crowded at the base; sheaths glabrous; ligule 1–2 mm. long, truncate, hyaline; blades 2–4 cm. long, 1–2 mm. wide, flat, minutely scabrous; panicles 3–5 cm. long, 1–1.5 cm. wide, rather lax; spikelets 3.5–4 mm. long; glumes subaequal, acute or subacuminate, dark purple, sparsely scabrous on the keel, the first 1- or weakly 3-nerved, the second 3-nerved; lemma 3 mm. long, 4-dentate, awned from the middle, the awn 6 mm. long, bent, loosely twisted below the bend, the callus hairs sparse, not more than 0.5 mm. long; rachilla segment 1 mm. long, densely hairy, the hairs as long as the lemma; palea very thin, a little shorter than the lemma, glabrous on the keels.

Type in the U. S. National Herbarium, No. 1387801, collected on rocky ridges, higher páramos, near El Gavilón, State of Mérida, Venezuela, altitude 4,200 meters, January 25, 1929, by H. Pittier (No. 13277½).

CALAMAGROSTIS STEYERMARKII Swallen, sp. nov.

Perennis; culmi caespitosi, erecti, 65 cm. alti; vaginae inferiores breves, densae, glabrae, eae culmorum elongatae internodiis longiores; laminae erectae, rigidae, involutae, glabrae, 15–25 cm. longae, suprema reducta; ligula obtusa, decurrens, 2 mm. longa; panicula 18 cm. longa, purpurascens, ramis gracilibus fasciculatis remotis, supra medium ramosis, inferioribus usque ad 11 cm. longis; glumae subaequales, 3–3.5 mm. longae, acutae, glabrae, in carina minute scabrae; lemma 2 mm. longum, obtusum, minute erosum; arista basi inserta, geniculata, infra geniculam contorta, quam lemmate duplo longiore; calli pili densi 1–1.5 mm. longi; rhachilla 0.4 mm. longa, sparse pilosa, apicis pilis lemma aequantibus; palea lemma aequans.

Perennial; culms tufted, erect, 65 cm. tall; lower sheaths short, crowded, glabrous, those of the culm elongate, longer than the internodes; blades erect, stiff, firm, glabrous, involute, 15–25 cm. long, the uppermost one reduced; ligule obtuse, decurrent, 2 mm. long; panicle 18 cm. long, dark purple, the very slender branches in distant fascicles, narrowly ascending, straight or somewhat flexuous, branching above the middle, those of each fascicle of unequal length, the longest 11 cm. long; glumes subequal, 3–3.5 mm. long, acute, deep purple, minutely scabrous on the keel, otherwise glabrous; lemma 2 mm. long, obtuse, minutely rose, awned from the back at the base, the

awn tightly twisted below, geniculate, protruding sideways from the glumes, about twice as long as the lemma, the callus hairs dense, 1–1.5 mm. long; rachilla joint 0.4 mm. long, sparsely hairy, the hairs at the tip as long as the lemma; palea equaling the lemma.

Type in the U. S. National Herbarium, No. 1911637, collected on paramos, in vicinity of Toreador, between Molleturo and Quinoas, Province of Azuay, Ecuador, altitude 3,810–3,930 meters, June 15, 1943, by Julian A. Steyermark (No. 53195).

CALAMAGROSTIS INVOLUTA Swallen, sp. nov.

Perennis; culmi dense caespitosi, erecti, 18–28 cm. alti; vaginae internodiis longiores, glabrae vel sparse retrorse pilosae; laminae 5–10 cm. longae, involutae, glabrae vel sparse retrorse pilosae; paniculae 5–7 cm. longae, 3–6 mm. latae, vix densae, ramis appressis basi nudis, inferioribus usque ad 2 cm. longis; spiculae 5–5.5 mm. longae; glumae purpureae, summo carina scabrae, prima 1-nervis, quam gluma secunda paulo brevior, secunda 3-nervis; lemma 4 mm. longum, minute scabrum, basi aristatum, arista 6 mm. longa, geniculata, infra geniculum contorta; calli pili inconspicui, ca. 0.5 mm. longi; rhachilla 1.4 mm. longa, sparse et minute pilosa.

Perennial ; culms densely tufted, erect, 18–28 cm. tall; sheaths longer than the internodes, glabrous or sparsely retrorsely pilose; ligule 0.5 mm. long, decurrent; blades 5–10 cm. long, involute, glabrous or sparsely retrorsely pilose; panicle 5–7 cm. long, 3–6 mm. wide, somewhat dense, the branches closely appressed, naked at the base, the lower ones as much as 2 cm. long; spikelets 5–5.5 mm. long; glumes dark purple, scabrous at the tip at least on the keel, the first 1-nerved, a little shorter than the second, the second 3-nerved; lemma 4 mm. long, minutely scabrous, awned from the base, the awn 6 mm. long, bent or geniculate, tightly twisted below the bend, the callus hairs inconspicuous, about 0.5 mm. long; rachilla segment 1.4 mm. long, sparsely and minutely pilose.

Type in the U. S. National Herbarium, no. 1353180, collected on Páramo de Mogotocoro, near Vetas, Department of Santander, Colombia, altitude 3,700–3,800 meters, January 18, 1927, by E. P. Killip and Albert C. Smith (No. 17618.)

CALAMAGROSTIS BREVIPALEATA Swallen, sp. nov.

Perennis; culmi erecti, basi decumbentes, 85 cm. alti; vaginas internodiis longiores, glabrae, inferiores breves, suprema elongata; ligula obtusa 1 mm. longa; laminae 10–25 cm. longae, 3 mm. latae, glabrae; panicula 15 cm. longa, 2 cm. lata, densa, in parte inferiore interrupta; glumea 5.5–6.5 mm. longae, acuminatae, carina minute ciliatae; lemma 5 mm. longum, glabrum, nervis lateralibus excur-

rentibus; arista vix supra medium inserta, 4.5 mm. longa, geniculata, in parte inferiore contorta hispido-scabra, supra geniculam glabra; calli pili densi ca. 1 mm. longi; rhachilla 1.3 mm. longa, pilosa, pilis superioribus usque ad 2 mm. longis; palea 2 mm. longa, hyalina, marginibus latis, carinis approximatis.

Perennial; culms erect from a decumbent base, 85 cm. tall; sheaths all longer than the internodes, the glabrous lower ones short, the uppermost elongate; ligule obtuse, 1 mm. long; blades 10–25 cm. long, 3 mm. wide, glabrous; panicle 15 cm. long, 2 cm. wide, dense, spikelike, interrupted below; glumes 5.5–6.5 mm. long, acuminate, minutely ciliate on the keel; lemma 5 mm. long, glabrous, the lateral nerves excurrent in awns 0.5–1 mm. long, awned from the back from just above the middle, the awn tightly twisted in the lower part, geniculate, 4.5 mm. long above the bend, hispid-scabrous below, glabrous or nearly so above, the callus hairs dense, about 1 mm. long; rachilla joint 1.3 mm. long, evenly hairy, the hairs from the tip as much as 2 mm. long; palea 2 mm. long, very thin, with broad margins, the keels approximate.

Type in the U. S. National Herbarium, No. 1911528, collected at Cayambe, Province of Pichincha, Ecuador, altitude 2,850 meters, July 16, 1945, by M. Acosta Solis (No. 10359).

CALAMAGROSTIS SCABRIFLORA Swallen, sp. nov.

Perennis; culmi erecti, 120 cm. alti, glabri, vel infra nodos strigosi; vaginae inferiores internodiis longiores, superiores breviores, glabrae vel in parte superiore scaberulae; ligula membranacea, minute ciliata, 2 mm. longa; laminae 30–60 cm. longae, 5 mm. latae, firmae, pungentes, glabrae; panicula 25 cm. longa, 1–1.5 cm. lata, densa, ramis subverticillatis, appressis, in parte inferiore nudis, inferioribus usque ad 8 cm. longis; spiculae breve pedicellatae, pedicellis quam spiculis multo brevioribus; glumae aequales, 3- 3.2 mm. longae, acutae, 1-nerves, in carina scabrae; lemma 3 mm. longum, acutum scabrum; calli pili ca. 0.5 mm. longi; arista supra basin 1 mm. inserta, 1.7 mm. longa, geniculata; palea hyalina lemmate vix brevior; rhachilla 0.8 mm. longa, sparse brevi-pilosa.

Perennial; culms erect, 120 cm. tall, glabrous, or strigose below the nodes; lower sheathes longer, the upper shorter than the internodes, rounded, glabrous, or scaberulous toward the summit; ligule membranaceous, minutely ciliate, 2 mm. long; blades 30–60 cm. long, 5 mm. wide, flat or drying involute, firm, pungently pointed, glabrous; panicle 25 cm. long, 1–1.5 cm. wide, dense, the branches sub-verticillate, appressed, naked below, those of the lowest fascicle as much as 8 cm. long; spikelets short-pedicellate, sometimes subsessile, the pedicels much shorter than the spikelets, appressed; glumes equal,

3–3.2 mm. long, acute, 1-nerved, scabrous on the keel; lemma 3 mm. long, acute, scabrous, the callus hairs sparse, about 0.5 mm. long, the awn inserted 1 mm. from the base, 1.7 mm. long, geniculate, protruding from between the glumes; palea thin, hyaline, acute, about as long as the lemma; rachilla about 0.8 mm. long, sparsely short-pilose.

Type in the U. S. National Herbarium, No. 1911639, collected in swampy meadow adjacent to Paramito, at base of Páramo de Tamá, 7 km. above Villapaez, State of Táchira, Venezuela, altitude 2,500 meters, July 14, 1944, by Julian A. Steyermark (No. 57231).

CALAMAGROSTIS SCABERULA Swallen, sp. nov.

Perennis; culmi erecti, 85 cm. alti, scaberuli; vaginae glabrae vel scaberulae, inferiore 8–10 cm. longae, suprema elongata, ca. 30 cm. longa, lamina reducta 9 cm. longa; ligula truncata, decurrens, 1.5 mm. longa; laminae ca. 50 cm. longae, firmae, conduplicatae, basi vagina multo angustiores; paniculae 32 cm. longae, 4 cm. latae, ramis fasciculatis, remotis, adscendentibus vel inferioribus divergentibus, in parte inferiore nudis vel ad basin floriferis; glumae 5–6 mm. longae, acuminatae, angustae, virides et purpureae; lemma 5 mm. longum, scabrum, minute bifidum, nervis lateralibus prominentibus; arista infra apicem 2.5 mm. inserta, 4.5 mm. longa, curvata, non geniculata vel contorta; calli pili 0.1 mm. longi; rhachilla ca. 2 mm. longa, gracilis, basi sparse brevi-pilosa; palea lemmate paulo brevior, hyalina, acuta, glabra, marginibus latis, carinis approximatis glabris; antherae 2.3 mm. longae.

Perennial; culms erect, 85 cm. tall, scaberulous; sheaths smooth or scaberulous, the lower ones 8–10 cm. long, the uppermost elongate, about 30 cm. long, reaching to the base of the panicle, with a reduced blade 9 cm. long; ligule truncate, decurrent, 1.5 mm. long; blades about 50 cm long, firm, folded, much narrower at the base than the mouth of the sheath; panicle 32 cm. long, about 4 cm. wide, the branches in rather distant fascicles, ascending, or the lower spreading, at least some of each fascicle floriferous to the base; glumes 5–6 mm. long, acuminate, narrow, green tinged with purple; lemma 5 mm. long, minutely bifid, scabrous, the lateral nerves prominent, the scabrous awn from the back, inserted 2.5 mm. from the tip, 4.5 mm. long, outwardly curved but not twisted or geniculate; callus hairs inconspicuous, 0.1 mm. long, rachilla joint nearly 2 mm. long, slender, glabrous except for a few short hairs at the base; palea nearly as long as the lemma, very thin, acute, glabrous, with broad margins, the keels approximate, glabrous; anthers 2.3 mm. long.

Type in the U. S. National Herbarium, No. 1910934, collected on páramo, Namanda, Ecuador, altitude 2,900 meters, November 24, 1946, by Reinaldo Espinosa (No. 1093).

CALAMAGROSTIS NAIGUATENSIS Swallen, sp. nov.

Perennis; culmi dense caespitosi, erecti, 50 cm. alti; vaginae glabrae; ligula 4–6 cm. longa, acuta, lata, decurrens; laminae erectae 10–20 cm. longae, conduplicatae, glabrae vel marginibus scabrae; panicula 10 cm. longa, laxa, ramis adscendentibus basi nudis; glumae subaequales, 4–4.5 mm. longae, acutae vel subacuminatae, virides et purpureae; lemma 3.5–4 mm. longum, scabrum, nervis minute excurrentibus, arista supra basin 0.5 mm. inserta, 4.5 mm. longa, geniculata, in parte inferiore contorta; palea lemma aequans, angusta, carinis approximatis minute scabris; rhachilla lemmate duplo brevior, sparse villosa pilis longis; antherae 1.5 mm. longae.

Perennial; culms densely tufted, erect, about 50 cm. tall; sheaths rounded, glabrous; ligule 4–6 cm. long, acute, broad, decurrent; blades erect, 10–20 cm. long, tightly folded, much narrower at the base than the mouth of the sheath, glabrous, or the margins scabrous; panicle about 10 cm. long, open, the branches ascending, naked at the base; glumes subequal, 4–4.5 mm. long, acute or subacuminate, green tinged with purple; lemma 3.5–4 mm. long, scabrous, shallowly lobed, the nerves minutely excurrent, the awn inserted less than 0.5 mm. from the base, 4.5 mm. long, loosely twisted below, geniculate, protruding sideways from the glumes; palea as long as the lemma, narrow, the keels approximate, minutely scabrous; rachilla half as long as the lemma, sparsely villous with long hairs; anthers 1.5 mm. long.

Type in the U. S. National Herbarium, No. 602185, collected in upper belt of Pico de Naiguata, southern slope, State of Miranda, Venezuela, altitude 2,400–2,765 meters, May 24, 25, 1913, by H. Pittier (No. 6495).

CALAMAGROSTIS DIVERGENS Swallen, sp. nov.

Perennis; culmi erecti 50 cm. alti, glabri; vaginae glabrae internodiis inferioribus longiores, superioribus breviores, suprema elongata; ligula hyalina, erosa, 2 mm. longa; laminae 15–20 cm. longae, 5–6 mm. latae, planae, adscendentes, suprema reducta, appressa; paniculae 11–12 cm. longae, ca. 6 cm. latae, ramis rigidis adscendentibus, inferioribus 4–5 cm. longis, basi nudis, ramulis rigide adscendentibus; spiculae 3.2–3.7 mm. longae (plerumque 3.5 mm), pedicellis 1–3 mm. longis glabris; glumae aequales, acutae vel subacuminatae, purpureae, summo carino minute scabrae; lemma 3 mm. longum, scabrum, summo minute laceratum arista ca. 0.6 mm. supra basin inserta, lemma aequante, geniculata, infra geniculam contorta; calli pili sparsi, ca. 0.5 mm. longi; rhachilla 1 mm. longa, summo sparse et minute pilosa; palea lemmate paulo brevior, marginibus latis, carinis approximatis scabris.

Perennial; culms erect, glabrous, 50 cm. tall; sheaths glabrous, the lower longer, the upper shorter than the internodes, the uppermost

elongate; ligule a thin erose membrane 2 mm. long; blades mostly 15–20 cm. long, 5–6 mm. wide, flat, stiffly ascending, glabrous, the margins scabrous, the uppermost reduced, appressed, reaching the base of the panicle; panicles 11–12 cm. long, about 6 cm. wide, open, the branches stiffly ascending, the lower ones 4–5 cm. long, naked below, the branchlets stiffly ascending; spikelets 3.2–3.7 mm. long (mostly 3.5 mm.), the glabrous pedicles 1.3 mm. long; glumes equal or nearly so, acute or subacuminate, purple, glabrous, sometimes minutely scabrous on the keel at the tip; lemma 3 mm. long, scabrous, the tip minutely lacerate, the awn inserted 1/5 from the base, as long as the lemma, tightly twisted below, geniculate; callus hairs rather sparse, about 0.5 mm. long; rachilla joint 1 mm. long, sparsely minutely pilose at the tip, otherwise glabrous; palea a little shorter than the lemma, with broad thin margins, the keels approximate, scabrous.

Type in the U. S. National Herbarium, No. 1850357, collected on "Páramo de Tamá, arriba de la Cueva, 3100–3200 m. alt.," Department Norte de Santander, Colombia, October 27, 1941, by J. Cuatrecasas, R. E. Schultes, and E. Smith (No. 12604A).

AGROSTIS LEHMANNI Swallen, sp. nov.

Perennis; culmi 45 cm. alti, erecti, basi decumbentes; vaginae internodiis longiores, glabrae, suprema basin paniculae aequans; ligula 7–8 mm. longa, lacerata, pubescens; laminae planae, 6–8 cm. longae, 2.5–3 latae (suprema usque ad 4 mm. lata), acutae, scaberulae; panicula 13 cm. longa, ca. 3 cm. lata, purpurea, densa, paulo laxa, ramis gracilibus adscendentibus vel divergentibus, ad basin floriferis; spiculae 3–3.5 mm. longae; glumae acuminatae, carina scabrae, secunda quam prima paulo brevior; lemma 1.3 mm. longum, glabrum, truncatum, nervis minute excurrentibus, costa medio aristatum; arista 6 mm. longa, geniculata, infra geniculam paulo contorta; palea minuta; antherae 0.6 mm. longae.

Perennial; culms 45 cm. high, erect from a decumbent base; sheaths all longer than the internodes, glabrous, the uppermost reaching the base of the panicle; ligule 7–8 mm. long, lacerate, pubescent; blades flat, 6–8 cm. long, mostly 2.5–3 mm. wide or the uppermost as much as 4 mm., acute, scaberulous; panicle 13 cm. long, about 3 cm. wide, purple, dense but rather lax, the slender branches ascending or somewhat spreading, floriferous to the base or nearly so; spikelets 3–3.5 mm. long; glumes acuminate, the second a little shorter than the first, scabrous on the keel; lemma 1.3 mm. long, glabrous, truncate, the nerves excurrent as minute points, awned from the middle of the back, the awn 6 mm. long, bent, only slightly twisted below the bend; palea minute; anthers 0.6 mm. long.

Type in the U. S. National Herbarium, No. 1856227, collected on Páramo de Puracé, Central Cordillera, Department of Cauca, Colombia, altitude 3,500 meters, May 26, 1944, by E. P. Killip and F. C. Lehmann (No. 38598).

AGROSTIS SCABRIFOLIA Swallen, sp. nov.

Perennis; culmi dense caespitosi, erecti, ca. 55 cm. alti, infra nodos scabri; vaginae internodiis longiores, scaberulae; ligula 2.5-5 mm. longa, obtusa vel subacuta, costa scabra; laminae 10–15 cm. longae, 2–3 mm. latae, rigidae, erectae, scabrae; paniculae 10–15 cm. longae, ca. 8 cm. latae, ramis fasciculatis adscendentibus, in parte inferiore nudis, ramulis et pedicellis divergentibus; spiculae 2.8–3 mm. longae; glumae aequales, acutae, carina scabrae; lemma 2 mm. longum, truncatum, minutissime erosum, glabrum, costa medio aristatum; arista 4 mm. longa, scabra, curvata, non contorta; palea minuta vel obsoleta.

Perennial; culms densely tufted, erect, about 55 cm. tall, scabrous at least below the nodes; sheaths mostly longer than the internodes, scaberulous; ligule 2.5–5 mm. long, obtuse or subactute, often erose, scabrous on the back; blades mostly 10–15 cm. long, stiff, erect, scabrous, flat, 2–3 mm. wide; panicles 10–15 cm. long, about 8 cm. wide, open, loosely flowered, the branches ascending, naked in the lower half, in rather distant fascicles, the lower fascicles with four, the upper with 2 or 3 branches, the branchlets and pedicels somewhat divergent; spikelets 2.8–3 mm. long; glumese qual, acute, scabrous on the keel; lemma 2 mm. long, truncate, very minutely erose, glabrous, awned, the awn about 4 mm. long, bent, not twisted, scabrous; palea minute or wanting.

Type in the U. S. National Herbarium, No. 1850358, collected on Páramo de Tamá, above Cueva, Department Norte de Santander, altitude 3,100–3,200 meters, October 27, 1941, by J. Cuatrecasas, R. E. Schultes, and E. Smith (No. 12608).

TRICHACHNE SERICEA Swallen, sp. nov.

Perennis rhizomatosa, cataphyllis dense pubescentibus; culmi erecti, 25–45 cm. alti, glabri; vaginae internodiis longiores vel breviores, pubescentes et sparse pilosae; ligula ca. 2 mm. longa; laminae 2–5 cm. longae, 2–4 mm. latae, acutae, dense pubescentes; paniculae 9–12 cm. longae, ca. 5 mm. latae, densae, ramis appressis; spiculae 5 mm. longae; gluma prima angusta, acuta vel acuminata, usque ad 1 mm. longa; gluma secunda acuminata, 5-nervis marginibus dense villosa; lemma sterile angustum, 3 mm. longum, 3-nerve, marginibus dense villosum; fructus 4 mm. longus, 0.8 mm. latus, acuminatus, minute papillosostriatus.

Perennial with long scaly rhizomes, the scales densely pubescent; culms erect, 25–45 cm. tall, glabrous; sheaths longer or a little shorter

than the internodes, pubescent and sparsely pilose; ligule about 2 mm. long; blades 2–5 cm. long, 2–4 mm. wide, acute, densely pubescent; panicle 9–12 cm. long, about 5 mm. wide, dense, the branches closely appressed; spikelets 5 mm. long excluding the hairs; first glume narrow, acute or acuminate, as much as 1 mm. long; second glume acuminate, 5-nerved, densely long villous on the margins; sterile lemma narrow, acuminate, 3 mm. long, 3-nerved, densely villous on the margins; fruit 4 mm. long, 0.8 mm. wide, acuminate, minutely papillose-striate.

Type in the U. S. National Herbarium No. 1912777 collected on sandy campo, Instituto Agronómico do Sul, Pelotas, Rio Grande do Sul, Brazil, April 20, 1946, by Jason R. Swallen (No. 9120).

DIGITARIA PURPUREA Swallen, sp. nov.

Perennis; culmi dense caespitosi, graciles, erecti, 48–65 cm. alti, glabri, internodiis longis; vaginae internodiis multo breviores, dense pilosae vel summo glabrae, infirmae dense villosae pilis luteolis, ligula membranacea, 1–2 mm. longa; laminae involutae vel planae, usque ad 1.5 mm. latae, inferiores elongatae, eae culmi multo breviores, 2–5.5 cm. longae; racemi 2–3, inaequales, 2.5–6 cm. longi, appressi; rhachis 0.2 mm. lata, angulata, plus minusve tortuosa; spiculae 3 mm. longae; binae, paulo remotae, prima sessilis, secunda pedicellata, pedicello 2 mm. longo summo crateriformi; spiculae dense villosae pilis purpureis; gluma prima lata, hyalina, enervis, 0.2–0.4 mm. longa; gluma secunda fructum aequans, 5-nervis; lemma sterile fructu paulo brevius et angustius, 3-nerve; fructus 3 mm. longus, abrupte acutus, purpureus, striatus.

Perennial; culms densely tufted, slender, erect, 48–65 cm. tall, glabrous, with long internodes; sheaths rounded, much shorter than the internodes, densely pilose with fine spreading hairs or glabrous toward the summit, the basal sheaths very densely appressed villous with yellowish hairs; ligule membranaceous, 1–2 mm. long; blades involute or flat, not more than 1.5 mm. wide, the basal ones and those of the innovations elongate, those of the culm much shorter, 2–5.5 cm. long; racemes 2 or 3, very unequal, 2.5–6 cm. long, closely appressed, the rachis about 0.2 mm. wide, angular somewhat tortuous; spikelets 3 mm. long, densely villous with dark purple hairs, paired, the pairs rather distant, one nearly sessile, the other pedicillate, the pedicel 2 mm. long, enlarged at the summit in a minute cup; first glume broad, hyaline, nerveless, 0.2–0.4 mm. long; second glume as long as the fruit, 5-nerved; sterile lemma a little shorter and narrower than the fruit, 3-nerved; fruit 3 mm. long, abruptly narrowed at the summit to an acute crest, striate, dark purple.

Type in the U. S. National Herbarium, No. 1912779, collected on campo, Turma No. 23, Paraná, Brazil, October 10, 1914, by P. Dusén (No. 15670).

DIGITARIA PARVA Swallen, sp. nov.

Annua; culmi graciles erecti, simplices vel ramosi, 18–50 cm. alti, glabri, vaginae internodiis plerumque breviores, compressae, carinatae, glabrae vel sparse pilosae; ligula membranacea, 1–2.5 mm. longa; laminae 4–8 cm. longae, 2–5 mm. latae, acuminatae, glabrae vel sparse pilosae; paniculae 5–9 cm. longae, ramis solitariis, gracilibus, adscendentibus, inferioribus usque ad 6 cm. longis, ramulis divergentibus; spiculae 1 mm. longae, 0.4 mm. latae, plerumque solitariae, pedicellis appressis spiculas fere aequantibus; gluma prima obsoleta; gluma secunda spiculam aequans, 5-nervis, marginibus sparse pilosa, pilis appressis; lemma sterile spicula paulo brevius et angustius, 5-nerve, marginibus et inter nervos pilosum, pilis appressis; fructus 1 mm. longus, fuscescens.

Annual; culms slender, erect, simple or branching, 18–50 cm. tall, glabrous; sheaths mostly shorter than the internodes, compressed, keeled, glabrous or sparsely pilose; ligule membranaceous, 1–2.5 mm. long; blades mostly 4–8 cm. long, 2–5 mm. wide, acuminate, glabrous or very sparsely pilose; panicles 5–9 cm. long, nearly as wide, the slender solitary branches ascending, the lowest as much as 6 cm. long, the branchlets divergent on one side of the branches; spikelets 1 mm. long, 0.4 mm. wide, usually solitary on the branchlets, the pedicels about as long as or shorter than the spikelets, appressed; first glume wanting; second glume as long as the spikelet, 5-nerved, sparsely appressed pilose on the margins; sterile lemma a little shorter and narrower than the spikelet, 5-nerved, appressed pilose between the nerves and on the margins; fruit 1 mm. long, acute, minutely striate, chestnut brown at maturity.

Type in the U. S. National Herbarium, No. 1866866, collected on moist open grassland, Amapá, Pará, Brazil, March 4–6, 1944, by Jason R. Swallen (No. 7002).

DIGITARIA INDUTA Swallen, sp. nov.

Annua; culmi 24–30 cm. alti, erecti, nodis inferioribus ramosis; vaginae internodiis longiores, compressae, papilloso-pilosae, pilis patentibus; ligula ca. 0.8 mm. longa, truncata, minute ciliata; laminae 5–13.5 cm. longae, 3–6 mm. latae, acuminatae, planae, dense villosae; racemi 3, adscendentes, 3.5–8 cm. longi; rhachis 0.3 mm. lata, sparse vel dense pilosa, marginibus scabra; spiculae densae, 1.6–2 mm. longae; gluma prima nulla; gluma secunda fructum aequans vel quam fructu paulo longior, 5-nervis, inter nervos laterales dense hispida, pilis rufis quam spicula longioribus; lemma sterile fructu brevius, 3-nerve,

marginibus et inter nervos dense pubescens; fructus 2 mm. longus, ellipticus, acutus, striatus, ferrugineus.

Annual; culms 24–30 cm. tall, erect, branching from the lower nodes, the branches appressed; sheaths longer than the internodes, somewhat compressed, rather densely papillose-pilose with spreading hairs; ligule about 0.8 mm. long, truncate, minutely ciliate; blades 5–13.5 cm. long, 3–6 mm. wide, acuminate, flat, densely villous on both surfaces; racemes 3, ascending, 3.5–8 cm. long, the rhachis 0.3 mm. wide, wingless, scabrous on the margins, sparsely to rather densely pilose with long spreading hairs; spikelets dense, 1.6–2 mm. long excluding the hairs; first glume wanting; second glume about as long as or a little longer than the fruit, 5-nerved, densely hispid between the lateral nerves, the rufous hairs extending beyond the spikelet; sterile lemma a little shorter than the fruit, 3-nerved, densely pubescent between the nerves and on the margins; fruit 2 mm. long, elliptic, acute, striate, reddish brown.

Type in the U. S. National Herbarium, No. 1612872, collected on bank of small creek in chapada, between Barra do Corda and Grajahú. Maranhão, Brazil, March 1–5, 1934, by Jason R. Swallen (No. 3660),

THRASYA RETICULATA Swallen, sp. nov.

Perennis; culmi 1.6 m. alti, erecti dense villosi, pilis appressis, nodis barbatis; vaginae internodiis multo longiores, sparse vel dense papilloso-hispidae; ligula truncata, 1 mm. longa; laminae 40–70 cm. longae, usque ad 1 cm. latae, supra dense villosae, subtus glabrae; racemi terminales et axillares, 16–21 cm. longi; rhachis 0.8 mm. lata; spiculae glabrae, 3 (—3.5) mm. longae; gluma prima unius spiculea obtusa, 0.5 mm. longa, enervis, alterae spiculae angusta, acuta, 1.5–2 mm. longa, 1-nervis; gluma secunda prominente reticulata, 7-nervis, 3 nervis centralibus minute excurrentibus; lemma sterile obscure reticulatum, palea et flosculo masculo includens; fructus 2.7 mm. longus, minute papilloso-striatus.

Perennial; culms 1.6 m. tall, erect, densely villous with appressed or spreading hairs, the nodes densely bearded; sheaths usually much longer than the internodes, sparsely to densely papillose-hispid, dark brown on the inner surfaces; ligule truncate, 1 mm. long; blades 40–70 cm. long, as much as 1 cm. wide, thickish, rather firm, acute, densely villous above, glabrous or nearly so beneath; racemes terminal and axillary from the upper sheath, 16–21 cm. long, the rachis 0.8 mm. wide; spikelets glabrous, mostly 3 mm. long (rarely as much as 3.5 mm.); first glume of one of each pair of spikelets broad, obtuse, nerveless, 0.5 mm. long, of the other 1.5–2 mm. long, narrow, acute, 1-nerved; second glume 7-nerved, the 3 median nerves excurrent as mucros, conspicuously reticulate veined; sterile lemma 5-nerved, the

nerves not excurrent, obscurely reticulate veined at the summit, enclosing a very well developed palea and a staminate flower; fruit narrowly pyriform, 2.7 mm. long, minutely papillose-striate-roughened.

Type in the U. S. National Herbarium, No. 1612976, collected in wet places along stream in chapada, between Barra do Corda and Grajahú, Maranhão, Brazil, March 1–5, 1934, by Jason R. Swallen (No. 3665).

AXONOPUS ANOMALUS Swallen, sp. nov.

Perennis; culmi erecti 65–75 cm. alti, glabri; vaginae compressae, carinatae, glabrae, summo marginibus ciliatae, inferiores breves, condensatae, superiores elongatae internodiis breviores; ligula membranacea, minute ciliata, ca. 0.3 mm. longa; laminae 10–16 cm. longae 4–6 mm. latae, planae, obtusae, glabrae, marginibus scabrae, basi papilloso-ciliatae, suprema reducta; racemi 3–7, graciles, adscendentes, 5–10 cm. longi, basi pubescentes vel pilosi; rhachis 0.4 mm. lata; spiculae 2 mm. longae; gluma secunda et lemma sterile aequalia, fructu longiora, obscure 5-nervia, pubescentia, summo marginibus longe pilosa, gluma acuta, lemma obtusum; fructus 1.7 mm. longus, oblongatus, subacutus, apice minute pubescens.

Perennial; culms erect, 65–75 cm. high, glabrous, the leaves mostly crowded toward the base; sheaths compressed, keeled, glabrous on the back, usually ciliate on the margins near the summit, the lower ones short, crowded, the upper ones elongare, shorter than the internodes; ligule membranaceous, minutely ciliate, about 0.3 mm. long; blades 10–16 cm. long, 4–6 mm. wide, flat, obtuse, glabrous on both surfaces, the margins scabrous, papillose-ciliate toward the base, the uppermost reduced; inflorescences terminal and axillary from the upper sheath of 3–7 slender, ascending, somewhat distant, racemes 5–10 cm. long, pubescent or pilose at the base, the rachis 0.4 mm. wide; spikelets 2 mm. long, the second glume and sterile lemma equal, slightly longer than the fruit, 5-nerved, the nerves obscure, the midnerve suppressed, pubescent or nearly glabrous between the nerves, usually long-hairy on the margins toward the summit, the hairs sometimes exceeding the spikelets, the glumes acute, the sterile lemma obtuse, the margin of the tip scabrous; fruit 1.7 mm. long, oblong, subacute, minutely pubescent at the apex.

Type in the U. S. National Herbarium, No. 1912292, collected on savanna east of Urachiche, State of Yaracuy, Venezuela, altitude 455 meters, May 29, 1944, by Julian A. Steyermark (No. 56846).

PASPALUM DELICATUM Swallen, sp. nov.

Annuum; culmi gracillimi, repentes, 40 cm. longi, nodis inferioribus radicantes, ramosi; vaginae glabrae, internodiis longiores vel breviores;

ligula usque ad 1.4 mm. longa; laminae 5–7 cm. longae, filiformes, tenues, laxae, glabrae; racemus solitarius, 1.5–4 cm. longus, exsertus, pedunculis elongatis filiformibus; spiculae 0.6 mm. longae, binae, obovatae, plano-convexae; gluma secunda elliptica, 3-nervis, glabra, fructu angustior; lemma sterile fructu duplo brevius, obtusum, 3-nerve, glabrum; fructus minute papilloso-striatus.

Annual; culms very slender, delicate, glabrous, about 40 cm. long, decumbent spreading, rooting at the lower nodes, branching from all but the uppermost node; sheaths glabrous, longer or shorter than the internodes; ligule as much as 1.4 mm. long; blades 5–7 cm. long, or the uppermost much reduced or wanting, filiform, soft and lax, glabrous; racemes solitary, 1.5–4 cm. long, arcuate, exerted on long filiform peduncles; spikelets 0.6 mm. long, paired, the pairs short-pedicellate, obovate, plano-convex; second glume elliptic, 3-nerved, glabrous, as long as but somewhat narrower than the fruit; sterile lemma about half as long as and narrower than the fruit, obtuse, weakly 3-nerved, glabrous; fruit minutely papillose-striate.

Type in the U. S. National Herbarium, No. 1125921, collected at La Quebradita, Llano de San Martín, Intendencia of Meta, Colombia, by H. Karsten.

Paspalum delicatum is related to *P. pictum* Ekman, which differs in being coarser, erect, with rather stiff erect blades as much as 2 mm. wide, 2–3 racemes (rarely 1 or 4), and spikelets 1 mm. long, the pairs of spikelets not pedicellate.

PANICUM HISPIDUM Swallen, sp. nov.

Annuum (?); culmi ca. 50 cm. alti, papilloso-hispidi; ligula ciliata, 2–3 mm. longa; laminae 15 cm. longae, 8 mm. latae, papilloso-hispidae, marginibus scabrae; paniculae terminales et axillares, terminales 23 cm. longae, 15 cm. latae ramis scaberrimiis adscendentibus, ramulis adscendentibus vel divergentibus; spiculae 3.5–3.6 mm. longae, glabrae, pedicellis 2–8 mm. longis divergentibus; gluma prima 2–2.2 (raro 2.8) mm. longa, acuta, 5-nervis, carina scabra; gluma secunda et lemma sterile subaequalia, 5–7 nervia, divergentia; fructus 2.3–2.4 mm. longus, ovato-ellipticus, subacutus.

Annual (?); culms about 50 cm. tall, papillose-hispid at least below the panicle; sheaths papillose-hispid with ascending hairs; ligule ciliate, 2–3 mm. long; blades 15 cm. long, 8 mm. wide, papillose-hispid, the margins very scabrous; panicles terminal and axillary, the terminal 23 cm. long, 15 cm. wide, the very scabrous branches stiffly ascending, the branchlets stiffly ascending or spreading; spikelets 3.5–3.6 mm. long, glabrous, the pedicels 2–8 mm. long, stiffly spreading; first glume 2–2.2 mm. long, rarely 2.8 mm., acute, 5-nerved, scabrous on the keel; second glume and sterile lemma subequal, gaping, rather

abruptly bluntly pointed, 5–7-nerved; fruit 2.3–2.4 mm. long, ovate-elliptic, bluntly pointed, pale, smooth and shining.

Type in the U. S. National Herbarium, No. 1869144, collected at Guinope, Department of El Paraiso, Honduras, altitude 1,981 meters, January 1, 1944, by Juvenal Valerio Rodríguez (No. 1981).

Panicum hispidum is closely related to *P. cayennense* Lam., which differs in being smaller with much more slender panicle branches and smaller spikelets 2–2.2 mm. long.

PANICUM HONDURENSIS Swallen, sp. nov.

Perenne; culmi 50 cm. longi, decumbentes, glabri; vaginae internodiis longiores, in collo pilosae, marginibus summo sparse ciliatae; ligula membranacea, 0.2 mm. longa, minute erosa; laminae planae, lineares, 20–28 cm. longae, 5–11 mm. latae, glabrae vel scaberulae, marginibus scabrae basi sparse ciliatae; panicula 25 cm. longa, 4 cm. lata, ramis gracilibus, angulatis, anguste adscendentibus, inferioribus usque ad 9 cm. longis; spiculae 1.8–1.9 mm. longae, glabrae, solitariae, binae, vel ternatae, in ramulis brevibus, gracilibus; gluma prima spicula duplo brevior, acuta, 3-nervis; gluma secunda et lemma sterile aequalia, subacuta, gluma 3-nervis, lemma sterile 5-nerve palea includens; fructus 1.6 mm. longus, anguste ovato-ellipticus, acutus, glaber.

Perennial (?); culms decumbent spreading, more than 50 cm. long, glabrous; sheaths all longer than the internodes, glabrous on the back, pilose on the collar, the margins sparsely ciliate toward the summit; ligule membranaceous, 0.2 mm. long, minutely erose; blades flat, linear, 20–28 cm. long, 5–11 mm. wide, glabrous or scaberulous, the margins scabrous, sparsely ciliate at the rounded base; panicles loosely flowered, about 25 cm. long, 4 cm. wide, partly enclosed in the sheath, the slender angular branches narrowly ascending, some of the lower ones as much as 9 cm. long; spikelets solitary, binate, or ternate, rather distant on the slender branchlets on one side of the branches, 1.8–1.9 mm. long, glabrous; first glume about half as long as the spikelet, acute, 3-nerved; second glume and sterile lemma equal, subacute, somewhat gaping at maturity, the glume 3-nerved, the lemma 5-nerved; sterile palea well developed but without a staminate flower; fruit 1.6 mm. long, narrowly ovate-elliptic, acute, pale, smooth and shining.

Type in the U. S. National Herbarium, No. 1869140, collected at San Lorenzo, Department of Valle, Honduras, altitude 20 meters, September 10, 1945, by Juvenal Valerio Rodríguez (No. 3323).

This species is allied to *Panicum laxum* Swartz which has smaller, short-pedicellate spikelets, 1–1.2 mm. long, densely crowded on the branchlets, and short, usually stiffly spreading branches.

PANICUM AEQUIVAGINATA Swallen, sp. nov.

Annuum; culmi decumbentes nodis inferioribus radicantes, 85 cm. longi, plurinodosi, internodiis aequilongis, nodis dense pubescentibus; ligula ciliata, 0.5 mm. longa; vaginae internodia aequantes, glabrae, in collo et marginibus dense pubescentes; laminae 6–11 cm. longae, 9.5–16.5 mm. latae, planae, acutae, adscendentes vel appressae, subtus glabrae, supra sparse pilosae, marginibus hispido-ciliatae; panicula longe exserta, 15 cm. longa, 8 cm. lata, ramis gracilibus adscendentibus; spiculae glabrae, 2.5–2.8 mm. longae, pedicellis gracilibus 1–7 mm. longis; gluma prima 1.5–1.7 mm. longa, triangularis, acuta, 3-nervis; gluma secunda et lemma sterile aequalia, 9-nervia, marginibus summo incurvatis; fructus 2 mm. longus, anguste ovalis, acutus, minute striatus.

Annual (?); culms decumbent spreading and rooting at the lower nodes, 85 cm. or more long, glabrous, several noded, the nodes about equally distant densely pubescent; ligule ciliate, 0.5 mm. long; sheaths, except the lower, as long as or slightly longer than the internodes, glabrous on the back, densely pubescent on the collar and along the margins; blades 6–11 cm. long, 9.5–16.5 mm. wide, flat, acute, appressed or ascending, glabrous beneath, sparsely pilose above, the margins hispid-ciliate; panicle long-exserted, 15 cm. long, about 8 cm. wide, the slender branches ascending; spikelets glabrous, 2.5–2.8 mm. long, the pedicles slender, 1–7 mm. long; first glume 1.5–1.7 mm. long, triangular, acute, 3-nerved; second glume and sterile lemma equal covering the fruit, strongly 9-nerved, the margins incurved at the summit; fruit 2 mm. long, narrowly oval, acute, minutely striate.

Type in the U. S. National Herbarium, No. 1910768, collected between Bom Gosto and Olivença, Bahia, Brazil, March 15, 1943, by Ricardo de Lemos Fróes (No. 19950).

ICHNANTHUS CHASEAE Swallen, sp. nov.

Perennis; culmi elongati, arcuati, ramose, infra nodos pubescentes; vaginae internodiis longiores, glabrae, collo dense pubescentes vel villosae; ligula membranacea, ciliata, ca. 2 mm. longa; laminae 21–34 cm. longae, 10–15 mm. latae, acuminatae, marginibus scabrae; panicula 33 cm. longa, ca. 12 cm. lata, ramis verticillatis rigide adscendentibus, inferioribus usque ad 20 cm. longis, ramulis et pedicellis patentibus; spiculae 3.5–4 mm. longae, scabrae; glumae et lemma sterile aequalia vel subaequalia; gluma prima acuta, 3–5- nervis; gluma secunda subobtusa, 5-nervis; lemma sterile palea bene evoluta includens; fructus 2.9–3 mm. longus, angustus, glaber, alis 0.5 mm. longis.

Perennial (?); culms long, arching, branching, sparsely pubescent at and below the nodes; sheaths longer than the internodes, glabrous, densely pubescent or villous on the collar; ligule a ciliate membrane

about 2 mm. long; blades 21–34 cm. long, 10–15 mm. wide, rounded at the base, acuminate, scabrous on the margins; panicle 33 cm. long, about 12 cm. wide, the branches verticillate, rather distant, narrowly and stiffly ascending, with enlarged pubescent pulvini in the axils, the lower as much as 20 cm. long, the branchlets and pedicels stiffly spreading; spikelets 3.5–4 mm. long, scabrous; first glume as long as or a little shorter than the sterile lemma, acute, 3–5-nerved; second glume and sterile lemma equal, blunt, 5-nerved, the lemma enclosing a well developed palea; fruit 2.9–3 mm. long, narrow, glabrous, the wings 0.5 mm. long.

Type in the U. S. National Herbarium, No. 1762176, collected on dry wooded cliff, between Maracay and Valencia, south side of Lake Valencia, State of Carabobo, Venezuela, altitude 500 meters, March 4, 1940, by Agnes Chase (No. 12340).

Ichnanthus chaseae is related to the following species, differing in having long branching culms, stiff, narrower, glabrous blades, glabrous sheaths, and larger spikelets.

ICHNANTHUS ALTUS Swallen, sp. nov.

Annus (?); culmi 1.6 mm. alti, erecti, robusti, infra nodos papilloso-pilosi; vaginae internodiis longiores, glabrae vel dense papilloso-hispidae, marginibus ciliatae, collo dense villosae; ligula membranacea, truncata, 1 mm. longa; partis mediae culmi laminae 30-38 cm. longae, usque ad 4.5 cm. latae, papilloso-pilosae, acuminatae, basi angustae, superiores et inferiores multo reductae; paniculae 45 cm. longae, ramis verticillatis anguste adscendentibus, inferioribus usque ad 20 cm. longis, in parte inferiore sparse ramosis; spiculae 3–3.2 mm. longae, scabrae; gluma prima lata, subcordata, acuta, glumam secundam aequans, 3–5- nervis, marginibus sparse pilosa vel glabra; gluma secunda et lemma sterile aequalia, 5-nervia, cucullata, glabra; fructus 2.3 mm. longus, alis angustis 0.5 mm. longis.

Annual (?); culms 1.6 m. tall, erect, stout, appressed papillose-pilose especially below the nodes; sheaths all longer than the internodes, glabrous to rather densely papillose-hispid, ciliate on the margins, densely villous on the collar; ligule membranaceous, truncate, 1 mm. long; blades of the mid-culm 30–38 cm. long, as much as 4.5 cm. wide, the upper and lower ones much reduced, narrowed toward the base, the apex acuminate, papillose-pilose on both surfaces; panicle 45 cm. long, the narrowly ascending branches in distant verticils, sparingly branched in the lower half, the lower branches as much as 20 cm. long, the upper ones gradually shorter; spikelets 3–3.2 mm. long, scabrous; first glume broad, somewhat clasping, as long as or slightly shorter than the second glume, acute, 3–5-nerved, sparsely pilose on the margins near the summit, or glabrous; second glume and sterile

lemma equal, 5-nerved, cucullate, glabrous; fruit 2.3 mm. long, winged at the base, the wings 0.5 mm. long, half as wide.

Type in the U. S. National Herbarium, No. 1797711, collected at Mitu "orillas rio Vaupés," Comisaría of Vaupés, Colombia, altitude 200 meters, September 13, 1939, by E. Pérez Arbeláez and J. Cuatrecasas (No. 6774).

Ichnanthus altus is related to *I. verticellatus* Mez, which differs in having glabrous spikelets, the first glume two-thirds as long as the spikelet, and glabrous sheaths and blades.

PARIANA SETOSA Swallen, sp. nov.

Perennis; culmi uniformes, ca. 1 m. alti; vaginae internodiis longiores, in ore glandulosae; ligula fusca, ca. 2 mm. longa; laminae lanceolati-acuminatae, 27–30 cm. longae usque ad 5.8 cm. latae, marginibus scabrae, petiolo 8 mm. longo; inflorescentia pendula, 22 cm. longa, apicem versus attenuata; spiculae masculae: glumae 6–8 mm. longae, basi latae, attenuatae, 2–3-nerves, marginibus ciliatae; lemma 6.8 mm. longum, 3 mm. latum, acutum, scaberulum, reticulatum; spiculae femineae alternae, 7 mm. longae; fructus ca. 5.5 mm. longus.

Perennial; inflorescences borne on leafy culms; culms probably about 1 m. tall (base lacking in type); sheaths all longer than the internodes, smooth and shining, with a large glandular area at the mouth; ligule brown, about 2 mm. long; blades lanceloate-acuminate, 27–30 cm. long, as much as 5.8 cm. wide, somewhat narrowed to a rounded base, the margins scabrous, otherwise glabrous, the petiole about 8 mm. long; spike 22 cm. long, drooping, tapering toward the summit; staminate spikelets: glumes 6–8 mm. long, broad at the base, 2–3 nerved, attenuate-pointed, softly ciliate on the margins; lemma 6.8 mm. long, 3 mm. wide, acute, scaberulous, faintly to rather prominently transversely nerved; pistillate spikelets alternate, about 7 mm. long, the fruit about 5.5 mm. long.

Type in the U. S. Nationel Herbarium, No. 1798754, collected in "selva higrofila en la Quebrada del río Afan," Mocoa, Comisaría of Putumayo, Colombia, altitude 570–680 meters, December 27, 1940, by J. Cuatrecasas (No. 11323).

This species differs from all others having large blades and inflorescences on leafy culms, in the long setaceous glumes of the staminate spikelets.

ZIZANIOPSIS KILLIPII Swallen, sp. nov.

Annua; culmi 2 m. alti, basi crassi, succulenti; vaginae elongatae, glabrae, lucidae, inferiores usque ad 5 cm. latae; folii supremi ligula 1.5 cm. longa, membranacea; laminae ca. 1 m. longae, 3.5–5 cm. latae,

sub-attenuatae, marginibus scaberrimae; panicula 75 cm. longa, 30 cm. lata, ramis verticillatis, adscendentibus, inferioribus usuqe ad 25 cm. longis, basi ad 10 cm. nudis, ramulis gracillimis adscendentibus vel divergentibus; spiculae masculae: lemma 3.5 mm. longum, 5-nerve, glabrum, vel dorso summo scabrum, arista scabra 1.5 mm. longa; palea acuminata, glabra, 4 mm. longa; spiculae femineae: lemma 5–6 mm. longum, 5-nerve, nervis scabrum, arista 4–6 mm. longa, scabra; palea acuminata, lemma aequans, carinis scabra.

Annual; culms 2 m. high, the base thick and succulent; sheaths elongate, the lower as much as 5 cm. broad, glabrous, shiny; ligule of uppermost sheath about 1.5 cm. long, membranaceous, straw-colored; blades about 1 m. long, 3.5–5 cm. long, tapering to the base, the tip rather long-acuminate, strongly scabrous on the margins, otherwise glabrous; panicle about 75 cm. long, about 30 cm. wide, the branches verticillate, ascending, naked at the base for as much as 10 cm., somewhat scabrous, the lower ones as much as 25 cm. long, the branchlets very slender, ascending to somewhat spreading; staminate spikelets; lemma 3.5 mm. long, 5-nerved, glabrous, or sparsely scabrous on the midnerve toward the summit, tapering to a rather stout scabrous awn 1.5 mm. long; palea acuminate, glabrous, 4 mm. long; pistillate spikelets: lemma 5–6 mm. long, 5-nerved, scabrous on the nerves, tapering into a scabrous awn 4–6 mm. long, the palea acuminate as long as the lemma, finely scabrous on the keels; pedicels of pistillate spikelet only slightly thickened upward, the spikelet falling without leaving tiny cup at the tip of the pedicel.

Type in the U. S. National Herbarium, Nos. 1856268 and 1856269, collected in water in dense tidal forest on banks of Quebrada Togoromá, Chocó, Colombia, June 13, 1944, by E. P. Killip and J. Cuatrecasas (No. 39099).

Zizaniopsis killipii resembles *Z. microstachya* (Nees) Doell & Aschers., which is larger, not succulent, the back of the sheaths and lower part of the midrib of the blades is very much thickened and hard, the blades are less than 3 cm. wide, quite firm, and the awns of the pistillate spikelets are only 1–2 mm. long.

ANDROPOGON CORDATUS Swallen, sp. nov.

Perennis; culmi 170 cm. alti, erecti, foliosi; vaginae internodiis paulo breviores, glabrae; laminae 27–30 cm. longae, 15–20 mm. latae, cordatae, attenuatae, glabrae, marginibus scabrae; inflorescentia 50 cm. longa, ramis foliosis, ramis secondariis gracilibus divergentibus; spathae 5–6.5 cm. longae, angustae; pedunculi graciles, 5–8 cm. longi, exserti; racemi 2 (1–3), graciles, flexuosi, pedunculati, 3.5–4.5 cm. longi; rhachis dense pilosa, pilis divergentibus 4 mm. longis; spicula sessilis 4–4.5 mm. longa, 0.5 mm. lata, acuta, glabra, arista gracili,

recta vel flexuosa, 10–15 mm. longa; spicula pedicellata mascula 5–6.5 mm. longa, conspicua; acuta vel acuminata, exaristata.

Perennial; culms erect from a knotty base, 170 cm. tall, leafy; sheaths a little shorter than the internodes, glabrous throughout; blades 27–30 cm. long, 15–20 mm. wide at the cordate base, gradually narrowed to a long attenuate tip, glabrous on both surfaces, the margins scabrous; inflorescence 50 cm. long, very compound, the main branches leafy; the secondary branches slender somewhat spreading; ultimate spathes 5–6.5 cm. long, very narrow; peduncles slender, excerted, 5–8 cm. long, bearing 1–3, usually 2, slender, flexuous, peduncled racemes 3.5–4.5 cm. long; rachis joints and sterile pedicels round, rather conspicuously hairy, more so toward the summit, with white, slender, spreading hairs 4 mm. long; sessile spikelet 4–4.5 mm. long, as long as the rachilla joint, 0.5 mm. wide, acute, glabrous, bearing a slender, straight or somewhat flexous awn 10–15 mm. long; pedicellate spikelet 5–6.5 cm. long, staminate, purplish, conspicuous, acute or acuminate, awnless.

Type in the U. S. National Herbarium, No. 1760631, collected at edge of forest, Chimore, Cochabamba, Bolivia, altitude 1,000 meters, November 2, 1937, by M. Cárdenas (No. 2083).

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UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

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VOLUME 29, PART 7

STUDIES IN THE BROMELIACEAE, XV

By LYMAN B. SMITH

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PREFACE

The present paper, by Lyman B. Smith, associate curator of the Department of Botany, U. S. National Herbarium, is a continuation of his series of studies of the family Bromeliaceae, being the fifteenth in the series. New and noteworthy species, occurring from Mexico and the Lesser Antilles south to Ecuador, are discussed. Thirty-four species and three varieties, based upon recently collected material, are described as new.

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Head Curator, Department of Botany,
United States National Museum.

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STUDIES IN THE BROMELIACEAE, XV

By Lyman B. Smith

INTRODUCTION

Since the publication of No. 14 in "Studies in the Bromeliaceae" [1] a number of species requiring description or critical notes have been studied. As their publication here is largely preliminary to their inclusion in various floristic works, they are grouped by countries. By far the largest number are new species from Colombia collected by Mulford and Racine Foster in 1946.

Thanks to the kindness of those in charge it has been possible to study material from the following herbaria: The Chicago Natural History Museum (CM), the Gray Herbarium of Harvard University (G), the herbarium of the Royal Botanic Gardens, Kew (K), the Botanical Museum, Munich (M), and the United States National Museum (US). Material from the Botanical Museum, Berlin-Dahlem (B), and from the Natural History Museum, Vienna (Vienna), was studied on the basis of type descriptions.

MEXICO

Tillandsia macdougallii L. B. Smith, sp. nov. Figure 2

Acaulis; foliis acuminatis, utrinque lepidibus cinereis patentibus vestitis; inflorescentia simplicissima, polystiche florigera; bracteis membranaceis, acutis vel caudatis; sepalis late oblanceolatis, dense lepidotis; petalis violaceis; staminibus exsertis.

Stemless; leaves numerous, 15–20 cm. long, covered with cinereous spreading scales, the sheaths distinct, broadly elliptic, the blades narrowly triangular, caudate-acuminate, 15 mm. wide at base; scape short and largely concealed by the leaves, curved; scape-bracts densely imbricate, elliptic with long foliaceous blades, membranaceous, roseate, densely lepidote; inflorescence simple with the flowers in several ranks, ellipsoid, 12 cm. long; bracts imbricate, the lower ones like the scape-bracts, the upper merely acute, all much exceeding the sepals; sepals subfree, broadly oblanceolate, acute, 35 mm. long, thin, densely cinereous-lepidote; petals erect, 6 cm. long, violet, stamens exserted.

Type in the U. S. National Herbarium, No. 1894950, collected at lower altitudes, at Lachatao, State of Oaxaca, Mexico, December 31, 1947, by T. MacDougall.

[1] Contr. Gray Herb. **161**: 29–35. 1946.

In its inflorescence and bracts, *Tillandsia macdougallii* closely resembles *T. benthamiana* Kl. and *T. andrieuxii* (Mez) L. B. Smith. It differs from *T. benthamiana* in its violet petals and from *T. andrieuxii* in its acute to caudate bracts. It is unlike either in its broadly oblanceolate densely lepidote sepals.

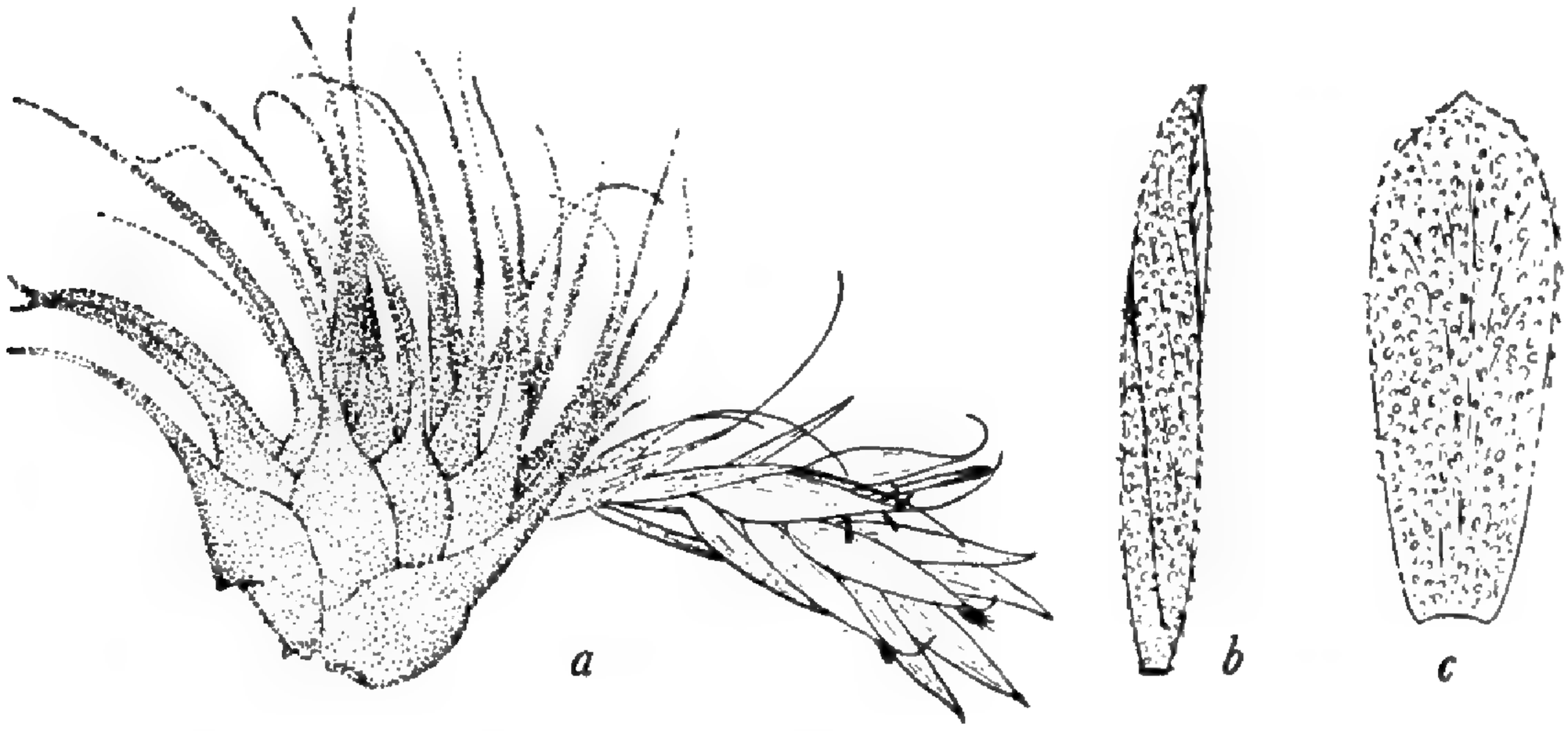

FIGURE 2.—*Tillandsia macdougallii: a*, Habit, × ¼; *b*, calyx, × 1; *c*, expanded sepal, × 1.

Tillandsia matudai L. B. Smith, sp. nov. FIGURE 3

Acaulis; foliis inflorescentiam multo superantibus, vaginis haud inflatis, laminis acuminatis; inflorescentia digitata subpendula; bractearum primarium vaginis quam spicis brevioribus; bracteis florigeris imbricatis, sepala superantibus; sepalis liberis; staminibus inclusis.

Stemless; leaves numerous, 14 cm. long, much exceeding the inflorescence, covered with spreading cinereous scales, sheaths elliptic, scarcely inflated, 4 cm. long, blades very narrowly triangular, acuminate, involute-subulate; scape very short, hidden by the leaves, decurved; scape-bracts foliaceous, densely imbricate; inflorescence of 7 spikes, densely digitate; primary bracts like the upper scape-bracts, their sheaths much shorter than the axillary spikes; spikes lanceolate, acute, densely few-flowered, slightly complanate; floral bracts densely imbricate, elliptic, broadly acute, to 37 mm. long, exceeding the sepals, ecarinate, chartaceous, nerved, probably rose, sparsely and obscurely lepidote; sepals free, narrowly lanceolate, 3 cm. long, alate-carinate, thin, glabrous; petals 4 cm. long, slightly exceeding the stamens.

Type in the Gray Herbarium, collected by carriage-road between Conitán and Amatenango del Valle, State of Chiapas, Mexico, altitude 2,100 meters, June 9, 1945, by E. Matuda (No. 5811).

Probably the only near relative of *Tillandsia matudai* is *T. mauryana* L. B. Smith, which has sharply carinate floral bracts and much smaller flowers. The habit of *T. matudai* is strikingly like that of certain Brazilian species such as *T. gardneri* Lindl.

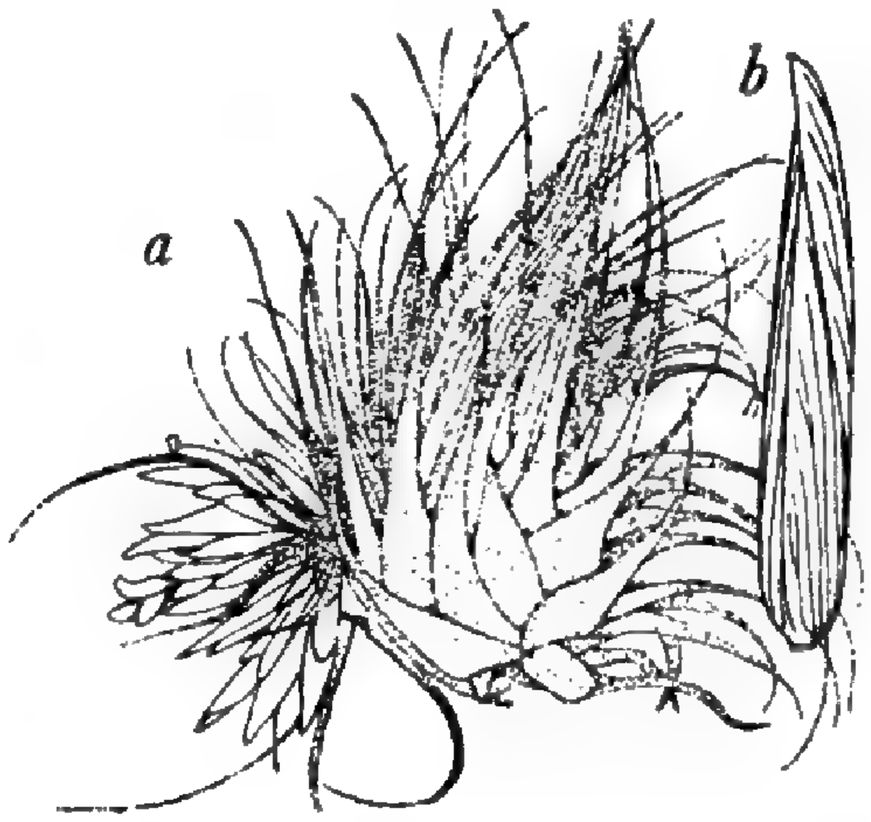

FIGURE 3.—*Tillandsia matudai: a*, Habit, × ¼; *b*, calyx, × 1.

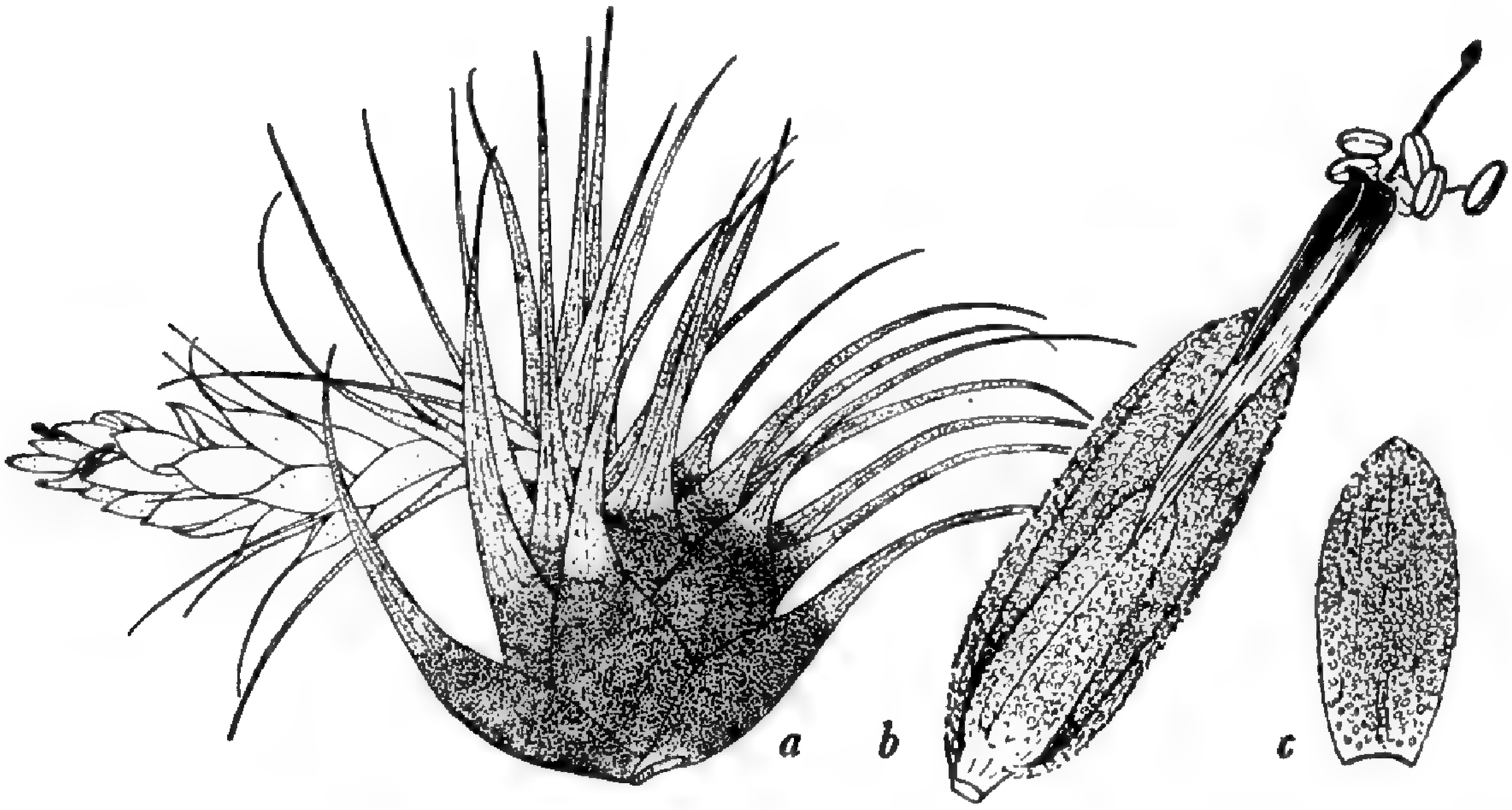

FIGURE 4.—*Tillandsia oaxacana: a*, Habit, × ¼; *b*, flower and bract, × 1; *c*, expanded sepal, × 1.

Tillandsia oaxacana L. B. Smith, sp. nov. **FIGURE 4**

Acaulis; foliis densissime adpresseque lepidotis, vaginis atro-castaneis, laminis acuminatis; scapo decurvato; scapi bracteis imbricatis; inflorescentia simplicissima, polystiche florigera; bracteis imbricatis, sepala superantibus, tenuibus, sepalis liberis, ellipticis, lepidotis; petalis violaceis; staminibus exsertis.

Stemless; leaves numerous, 2 dm. long, very densely appressed-lepidote, the sheaths distinct, broadly elliptic, dark castaneous, the

blades narrowly triangular, cinereous-lepidote; scape short, decurved, hidden by the leaves; scape-bracts densely imbricate, subfoliaceous but the bases roseate; inflorescence simple with the flowers in several ranks, subcylindric, 12 cm. long; bracts imbricate, exceeding the sepals, elliptic, subpapyraceous, roseate, densely cinereous-lepidote, the lowest with long foliaceous blades; sepals free, elliptic, 25 mm. long, thin, densely lepidote; petals erect, 5 cm. long, violet; stamens exserted.

Type in the U. S. National Herbarium, No. 1894945, collected at Lachatao, State of Oaxaca, Mexico, December 21, 1947, by T. MacDougall.

Its simple many-ranked inflorescence and thin roseate bracts place *Tillandsia oaxacana* next to *T. benthamiana* Kl. and *T. andrieuxii* (Mez) L. B. Smith, but its leaves with their appressed scales and dark castaneous sheaths are strikingly different.

GUATEMALA

Pitcairnia flagellaris L. B. Smith, sp. nov. FIGURE 5

Caulescens; foliorum vaginis parvis, suborbicularibus; laminis dimorphis, alteris flagelliformibus, alteris supra basin paulo angustatis, linearibus; scapi bracteis quam internodiis brevioribus; inflorescentia depauperatim paniculata; bracteis florigeris quam pedicellis brevioribus; sepalis acutis; petalis rubris, basi ligula auctis; ovulis caudatis.

Reproducing by stolons, the flowering plant over 5 dm. high; stem prostrate, at least 9 cm. long, covered with the remnants of old leaves; leaves numerous, subrosulate, to 7.5 dm. long, subspreading, the sheaths small, suborbicular, dark castaneous, serrulate toward the apex, the blades apparently all persistent, serrate at base, dimorphic, some very slenderly flagelliform, others slightly narrowed above the base but not petiolate, linear, acuminate, 11 mm. wide; scape erect, slender, glabrous; scape-bracts narrowly triangular, much shorter than the internodes; inflorescence a lax depauperate panicle, 33 cm. long; primary bract scarcely larger than the lower floral bracts; the single lateral branch 13 cm. long with a long sterile base; floral bracts lanceolate, about half as long as the pedicels; flowers subspreading; pedicels very slender, 19 mm. long, white-flocculose at the base; sepals oblong-lanceolate, acute, 14 mm. long, ecarinate, glabrous; petals obtuse, red, bearing a truncate lacerate scale at base; stamens included; ovary two-thirds superior, the ovules short-caudate.

Type in the Chicago Natural History Museum, collected on vertical limestone bluff, Montaña Yxocubvain, 2½ miles west of Cubilgüitz, Department of Alta Verapaz, Guatemala, altitude 300–500 meters, March 12, 1942, by J. A. Steyermark (No. 44976). Duplicate at G.

The green whiplike form of its reduced leaf-blades is the most outstanding character of *Pitcairnia flagellaris*. The great majority of the

species of *Pitcairnia* with dimorphic leaf-blades have the reduced ones in the form of stiff serrate chestnut-colored spines. It is hard to say where to place *P. flagellaris* in a key like that of the Pflanzenreich because one does not know whether to consider the inflorescence truly compound or not. Phylogenetically it appears to be a forerunner of the specialized type, with a simple inflorescence and partly deciduous dimorphic blades, that is so common in Mexico.

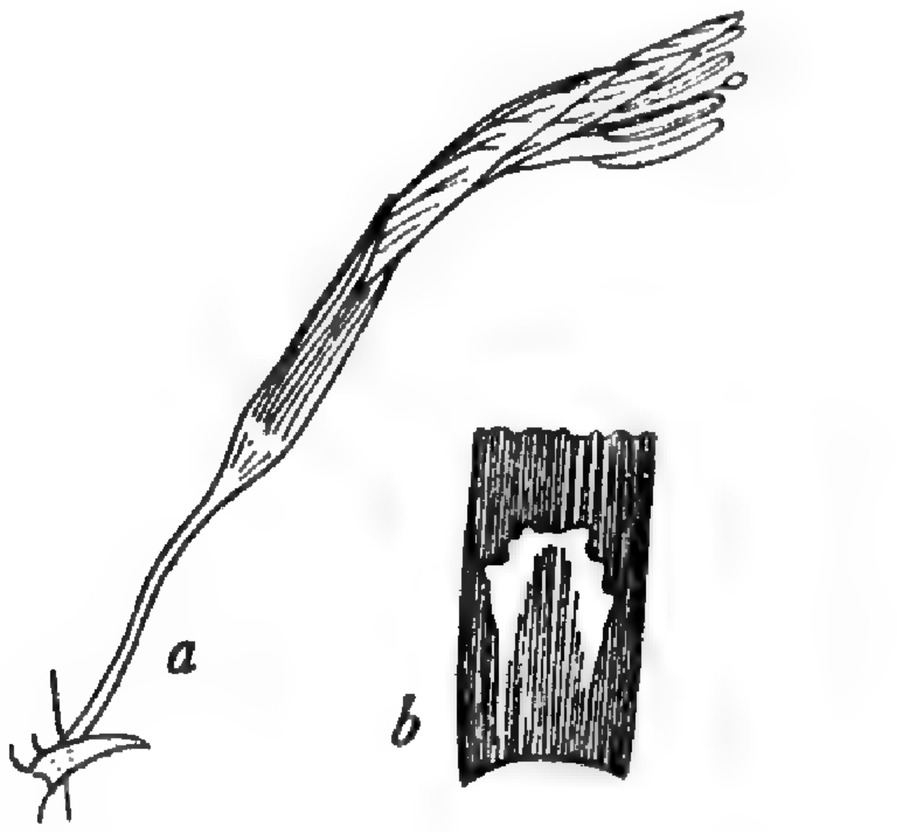

FIGURE 5.—*Pitcairnia flagellaris: a*, Flower and bract, × 1; *b*, base of petal, × 3.

Tillandsia guatemalensis L. B. Smith, nom. nov.

Allardtia cyanea A. Dietr. in Otto & Dietr. Allgem. Gartenzeit. **20:** 241. 1852.

Tillandsia cyanea (A. Dietr.) E. Morr. Belg. Hort. **29:** 297. 1879, not Linden ex Koch, Wochenschr. **10:** 140. 1867.

Tillandsia excelsa sensu L. B. Smith & Lundell, Brom. Yucatan Penin. in Carnegie Inst. Washington Publ. **522:** 112. 1940, not Griseb. 1864.

The discovery of a scanty but technically adequate use of the name *Tillandsia cyanea* prior to E. Morren's combination forces us to discard his name as a later homonym.

In previous papers I made the main distinction between *T. cyanea* E. Morr. and *T. excelsa* Griseb. on the absolute size of the sepals and thereby misdetermined the larger-flowered material of *T. cyanea*. The best distinction is in the large secondary bracts of *T. excelsa*, which are half as long as the broad few-flowered spikes, and in the consistently ecarinate sepals.

PANAMA

Pitcairnia chiriquensis L. B. Smith, sp. nov. FIGURE 6

Foliis dimorphis, laminis alteris ad spinas brunneas aculeatas reductis, alteris linearibus integerrimis; scapi bracteis internodia superantibus; inflorescentia laxe paniculata, bracteis florigeris pedicellos superantibus, angustis; sepalis lanceolatis, 15 mm. longis; petalis rubris; ovulis apiculatis.

Flowering plant 9 dm. high; leaves dimorphic, the outer ones with small orbicular deep castaneous sheaths and blades reduced to spinose-

serrate spines, the inner 75 cm. long, entire, slightly contricted between sheath and blade, sparsely flocculose, soon glabrous, the sheath narrowly triangular, pale, the blade linear with a median channel, 23 mm. wide; scape erect, slender; inflorescence laxly compound, white-flocculose; primary bracts linear, much shorter than the ascending branches; only the apical half of the lateral branches fertile; floral bracts narrowly triangular, exceeding the slender 5 mm. long pedicels; flowers ascending; sepals lanceolate, acute, 15 mm. long, ecarinate; petals 5 cm. long, red, bearing a bidentate scale at base; stamens included; ovary two-thirds superior; ovules apiculate.

Type in the U. S. National Herbarium, No. 1945467, collected on sheer rock faces, at Cerro Galera Chorcha, vicinity of Gualaca, Province of Chiriquí, Panama, altitude 300 meters, August 1, 1947, by Paul H. Allen (No. 5016).

In the key in the Pflanzenreich *Pitcairnia chiriquensis* would fall next to *P. hartmanni* Mez, from which it differs in its dimorphic leaves.

FIGURE 6.—*Pitcairnia chiriquensis: a*, Branch of inflorescence, × ½; *b*, flower and bract, × 1; *c*, sepal, × 1; *d*, base of petal, × 1.

LESSER ANTILLES

Tillandsia antillana L. B. Smith, sp. nov. FIGURE 7

Foliorum laminis angustissime triangularibus; inflorescentia bipinnatim paniculata; bracteis primariis brevissimis; spicis longe stipitatis; bracteis florigeris internodia plus quam duplo superantibus sed rhachin haud obtegentibus, quam sepalis brevioribus; sepalis liberis; staminibus inclusis.

Epiphytic, known only from fragments but undoubtedly stemless; leaves 6 dm. long, densely and minutely appressed-lepidote, sheaths large, castaneous, blades very narrowly triangular; scape unknown; inflorescence bipinnate, the axis 8 mm. in diameter, the internodes 15–20 mm. long; primary bracts ovate with a caudate apex, much shorter than the sterile base of the spike, cinereous-lepidote; spikes strict, long-stipitate with many imbricate sterile bracts; floral bracts more than twice as long as the internodes but divergent and not at all imbricate, elliptic, carinate, incurved, 28 mm. long, distinctly exceeded by the sepals, subcoriaceous, sulcate, glabrous; pedicels 2

mm. long; sepals free, lanceolate, the posterior ones carinate with the keel decurrent on the pedicel; petals 4 cm. long; stamens included.

Type in the U. S. National Herbarium, No. 1559010, collected in humid place, La Josephine au Matouba, Guadeloupe, French West Indies, altitude 560 meters, February 20, 1936, by H. Stehlé (No. 887).

The exserted sepals distinguish *Tillandsia antillana* from most of the large species of the subgenus *Allardtia*, and it is difficult to suggest any close relative for the species. Possibly the nearest would be *T. subimbricata* Bak., which is widely distributed around the Caribbean Sea.

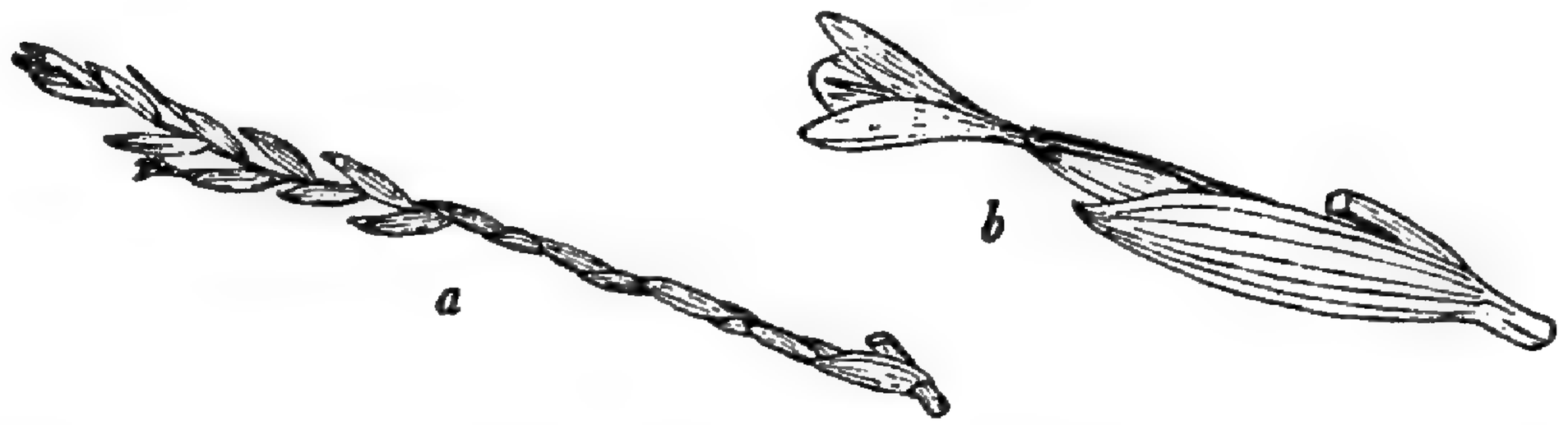

FIGURE 7.—*Tillandsia antillana: a*, Branch of inflorescence, × ¼; *b*, flower and bract, × 1.

VENEZUELA

Lindmania serrulata L. B. Smith, sp. nov. **FIGURE 8**

Verisimiliter grandis; foliis ensiformibus, basi haud angustatis, utrinque dense serrulatis; inflorescentia bipinnatim paniculata; sepalis late ellipticis, serrulatis.

Known only from leaves and fragments of a very young inflorescence, probably a meter or more high; leaves ensiform, without a distinct sheath, subulate-acuminate, 3–4 dm. long, 28 mm. wide, subdensely serrulate with curved spines 0.5 mm. long, sparsely and obscurely pale-lepidote above, nearly glabrous beneath; inflorescence bipinnate; primary bracts very narrowly triangular, 35 mm. long, the lowest already exceeded by its axillary branch, serrulate, membranaceous, flocculose with fine linear scales; branches suberect, simple, densely many-flowered; floral bracts like the primary bracts, 7 mm. long; unopened flowers 3.5 mm. long, short-pedicellate, not

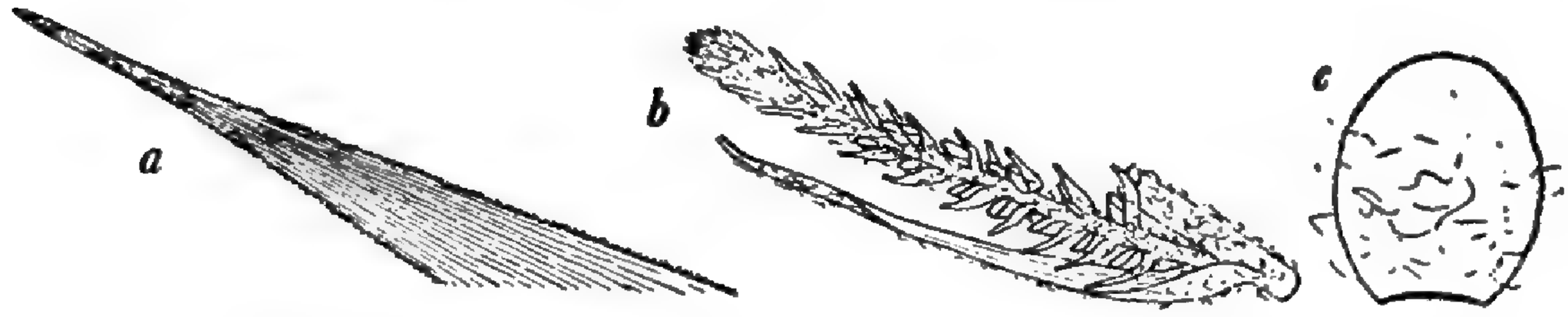

FIGURE 8.—*Lindmania serrulata: a*, Apex of leaf, × 1; *b*, branch of inflorescence, × 1; *c*, sepal × 5.

secund; sepals broadly elliptic, obtuse, densely and minutely serrulate; anthers apiculate.

Type in the U. S. National Herbarium, No. 1909909, collected in rocky places at Cerro Apacara, Río Caroní, State of Bolívar, Venezuela, altitude 2,000 meters, July 7, 1946, by F. Cardona (No. 1587).

In habit, *Lindmania serrulata* probably resembles *L. albicans* (Griseb.) Mez of Argentina more closely than it does any other species. However, the serrulation of its parts, extending even to the sepals, is the most extreme in the genus.

COLOMBIA

Aechmea corymbosa (Mart.) Mez in Mart. Pl. Bras. **3**[**1**]: 316. 1892. FIGURE 9

Billbergia corymbosa Mart. ex Schultes in R. & S. Syst. **7**: 1268. 1830.

TYPE LOCALITY: Porto dos Miranhas (Puerto Mirañas), on Río Caquetá, Amazonas, Colombia. Type collected by Martius.

COLOMBIA:

VAUPÉS: Epiphytic, forest between Río Apoporis and Río Vaupés, path from Puerto Naré to Victoria, alt. ca. 300 m., April 10-17, 1943, *R. E. Schultes* 5377 (G).

AMAZONAS: Puerto Mirañas, on Río Caquetá, 1820, *Martius* (M, type).

PERU:

LORETO: Epiphytic, Mishuyacu, near Iquitos, alt. 100 m., Feb.–Mar. 1930, *Klug* 1095 (CM, US).

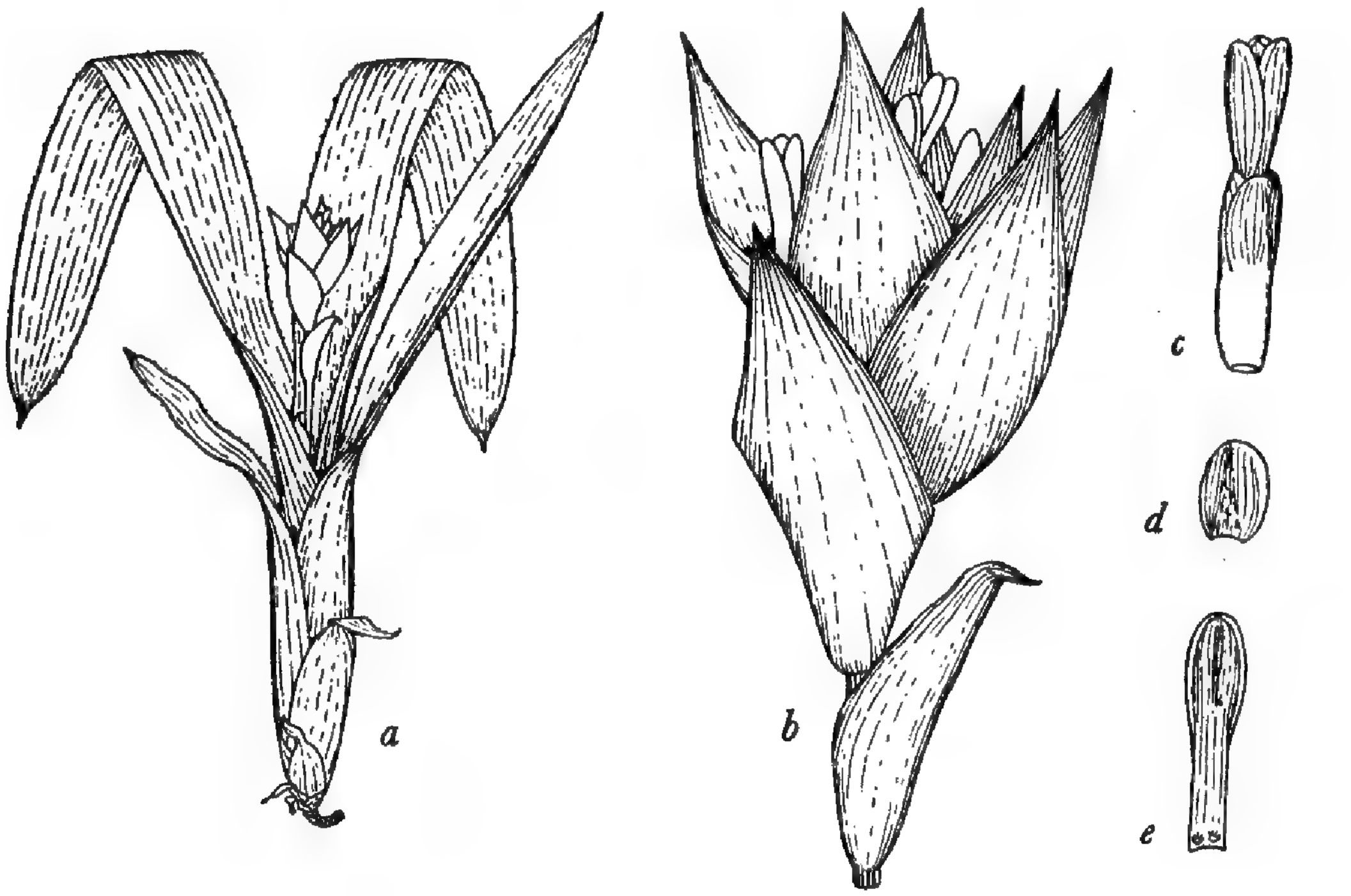

FIGURE 9.—*Aechmea corymbosa*: *a*, Habit, × 1/5; *b*, inflorescence, × 1; *c*, flower, × 1; *d*, sepal, × 1; *e*, petal, × 1.

Until now *Aechmea corymbosa* has been known only from the type and has always been ascribed to Brazil. Actually, as shown by Dugand,[2] Martius' locality is within the present boundaries of Colombia. The Schultes specimen here illustrated has a few teeth on the bracts, but they are so very small that they may well have been overlooked in the type where the bracts are described as entire.

Bromelia fragilis L. B. Smith, sp. nov. FIGURE 10

Laminis foliorum basi nullo modo angustatis; inflorescentia corymbosa, inter folia nidulante, lepidibus linearibus atro-brunneis vestita; bracteis florigeris elliptico-oblongis, ovarium subaequantibus, pertenuibus; sepalis integris, quam ovario multo brevioribus; petalis ultra medium connatis.

Plant terrestrial, 60–75 cm. high (! Foster); leaves over 120 cm. long, sheaths large, suborbicular, their apices covered with dark brown linear scales, blades linear, not at all petiolate, to 4 cm. wide, laxly serrate with hooked spines to 5 mm. long, covered with appressed white scales; scape none; inflorescence densely corymbose, sunk in the center of the rosette, few-flowered, covered with dark brown linear scales; primary bracts broadly elliptic, 7 cm. long, coarsely serrate, dark brown and rather papery when dry; floral bracts elliptic-oblong, about equaling the ovary, laxly serrulate, very thin; sepals lance-oblong, cucullate, 22 mm. long, entire, thin; petals 33 mm. long, joined with the filaments into a tube 18 mm. high; ovary cylindric, 5 cm. long.

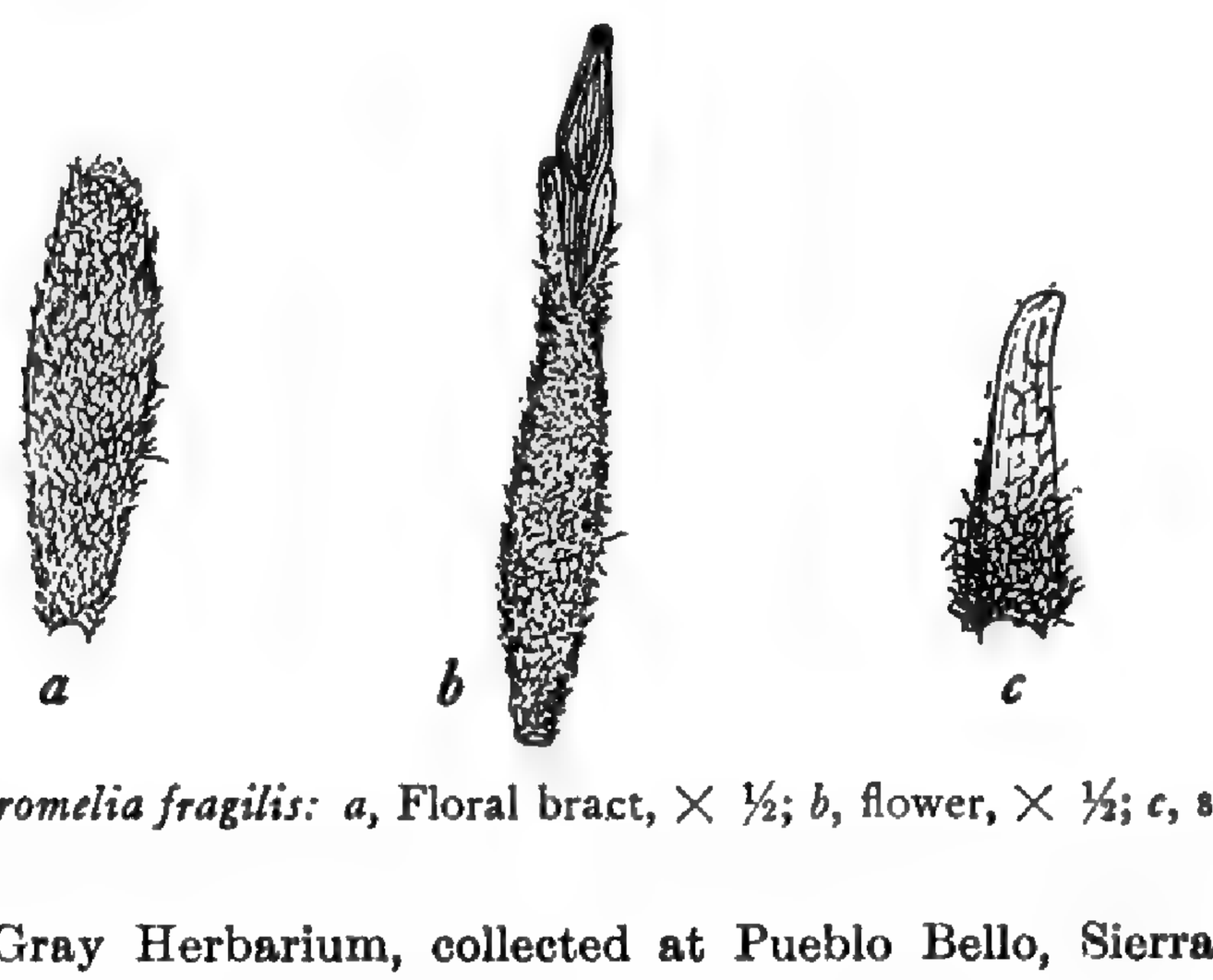

FIGURE 10.—*Bromelia fragilis: a*, Floral bract, × ½; *b*, flower, × ½; *c*, sepal, × 1.

Type in the Gray Herbarium, collected at Pueblo Bello, Sierra Nevada de Santa Marta, Department of Magdalena, Colombia, altitude 960 meters, August 19, 1946, by M. B. and R. Foster and E. Smith (No. 1469).

The collectors note that the whole plant of *Bromelia fragilis* is about one-fourth the size of *B. karatas* L. This new species appears most

[2] Rev. Acad. Colombiana de Ciencias 5: 212–216. Dec. 1942.

nearly related to *B. nidus-puellae* André but differs from that species in its smaller sepals and broader floral bracts.

Greigia collina L. B. Smith, sp. nov. FIGURE 11

Foliis subtus dense cinereo-lepidotis, laminis ad 28 mm. latis, basi angustatis et spinis atris 5 mm. longis armatis; inflorescentiis lateralibus, paucifloris; bracteis primariis atro-castaneis, integerrimis; sepalis 15 mm. longis, tenuibus, nervatis.

Terrestrial, growing in masses, short-caulescent; leaves many, subrosulate, 9–12 dm. long (! Foster), densely cinereous-lepidote beneath, the sheaths oblong, entire, dark castaneous at base, the blades linear, acuminate, 28 mm. wide, narrowed at base and armed with dark teeth 5 mm. long, entire near the middle, densely serrulate toward apex; inflorescences lateral, few-flowered, compressed, 5 cm. long; primary bracts broadly triangular-ovate, thick-subulate toward apex, 4 cm. long, much exceeding the sepals, dark castaneous, sparsely white-lepidote, entire; floral bracts broadly lanceolate, subulate-acuminate, 24 mm. long, about equaling the sepals, dark castaneous except for the pale base and margins, nerved, sparsely appressed-white-lepidote; flowers sessile; sepals elliptic, 15 mm. long, thin, nerved, pale castaneous, sparsely lepidote; ovary sparsely ferruginous-lepidote.

Type in the Gray Herbarium, collected near Fusagasugá, Department of Cundinamarca, Colombia, altitude, 2,700 meters, October 12, 1946, by M. B. and R. Foster (No. 1868). Duplicate in U. S. National Herbarium.

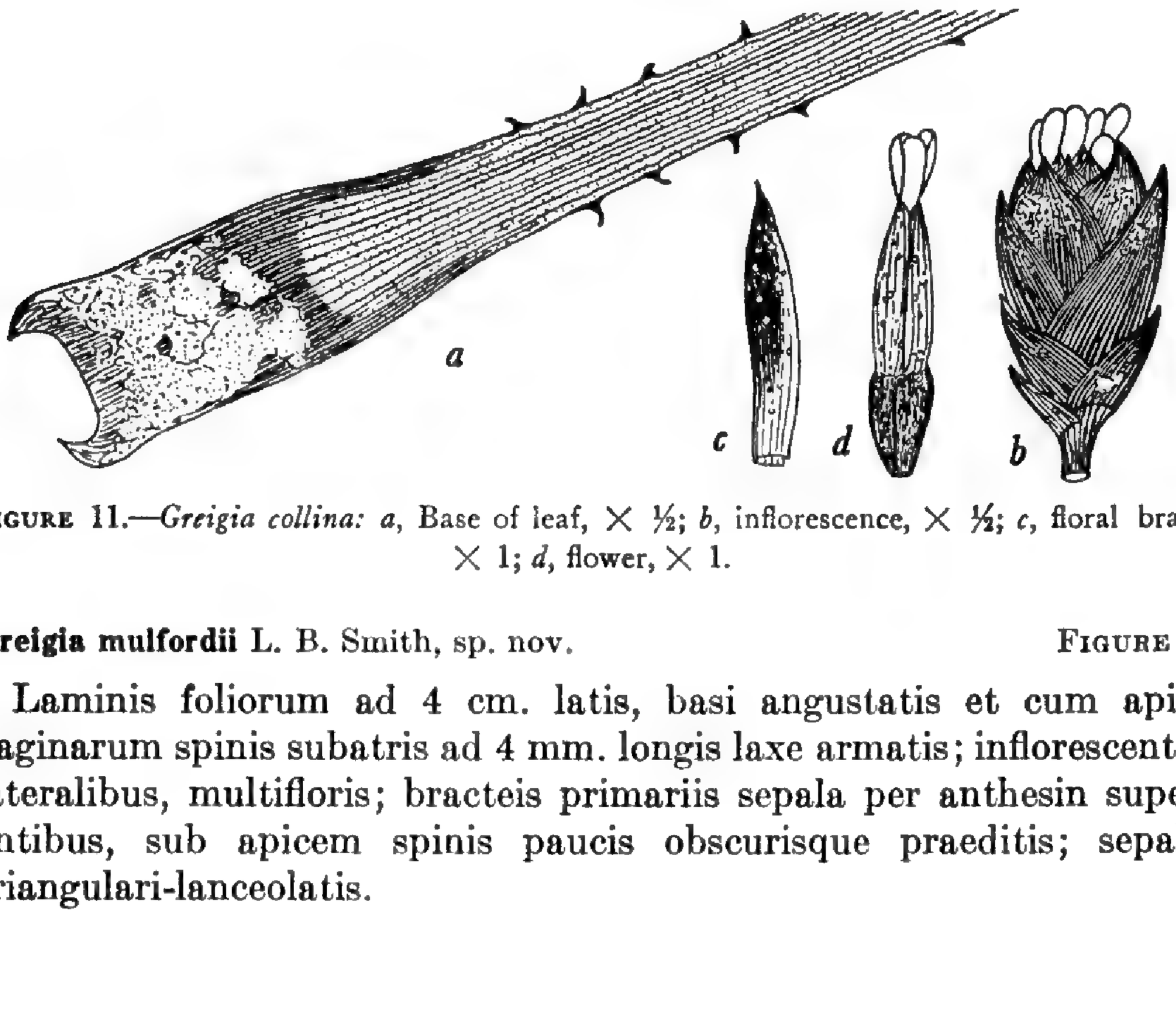

FIGURE 11.—*Greigia collina: a*, Base of leaf, × ½; *b*, inflorescence, × ½; *c*, floral bract, × 1; *d*, flower, × 1.

Greigia mulfordii L. B. Smith, sp. nov. FIGURE 12

Laminis foliorum ad 4 cm. latis, basi angustatis et cum apice vaginarum spinis subatris ad 4 mm. longis laxe armatis; inflorescentiis lateralibus, multifloris; bracteis primariis sepala per anthesin superantibus, sub apicem spinis paucis obscurisque praeditis; sepalis triangulari-lanceolatis.

Terrestrial, caulescent; stem erect, 3–15 dm. long (! Foster); leaves 8 dm. long, brown-lepidote throughout, concolorous, the sheaths elliptic, the blades linear, acuminate, 4 cm. wide, narrowed at base and with the apex of the sheath laxly serrate with dark spines 4 mm. long; inflorescences lateral, numerous, compressed, many-flowered, 6–7 cm. long; primary bracts broadly elliptic with narrowly triangular apices, 35–45 mm. long, exceeding the sepals at anthesis, dark castaneous except for narrow green margins and apices, nearly even, coriaceous, bearing a few obscure teeth toward apex, sparsely pale-appressed-lepidote; floral bracts lanceolate, subulate-acuminate, 3 cm. long, sparsely lepidote, base and margins pale and membranaceous, elsewhere castaneous and coriaceous; flowers sessile; sepals lance-triangular, subulate-acute, 21 mm. long, pale except for the castaneous apex, sparsely lepidote; petals 35 mm. long, the blades pale lilac (! Foster), sparsely lepidote within.

Type in the Gray Herbarium, collected in cloud-forest of páramo, Alto Tabano above Encano, Territory of Putumayo, Colombia, altitude 3,300 meters, October 31, 1946, by M. B. and R. Foster (No. 2041). Duplicate in U. S. National Herbarium.

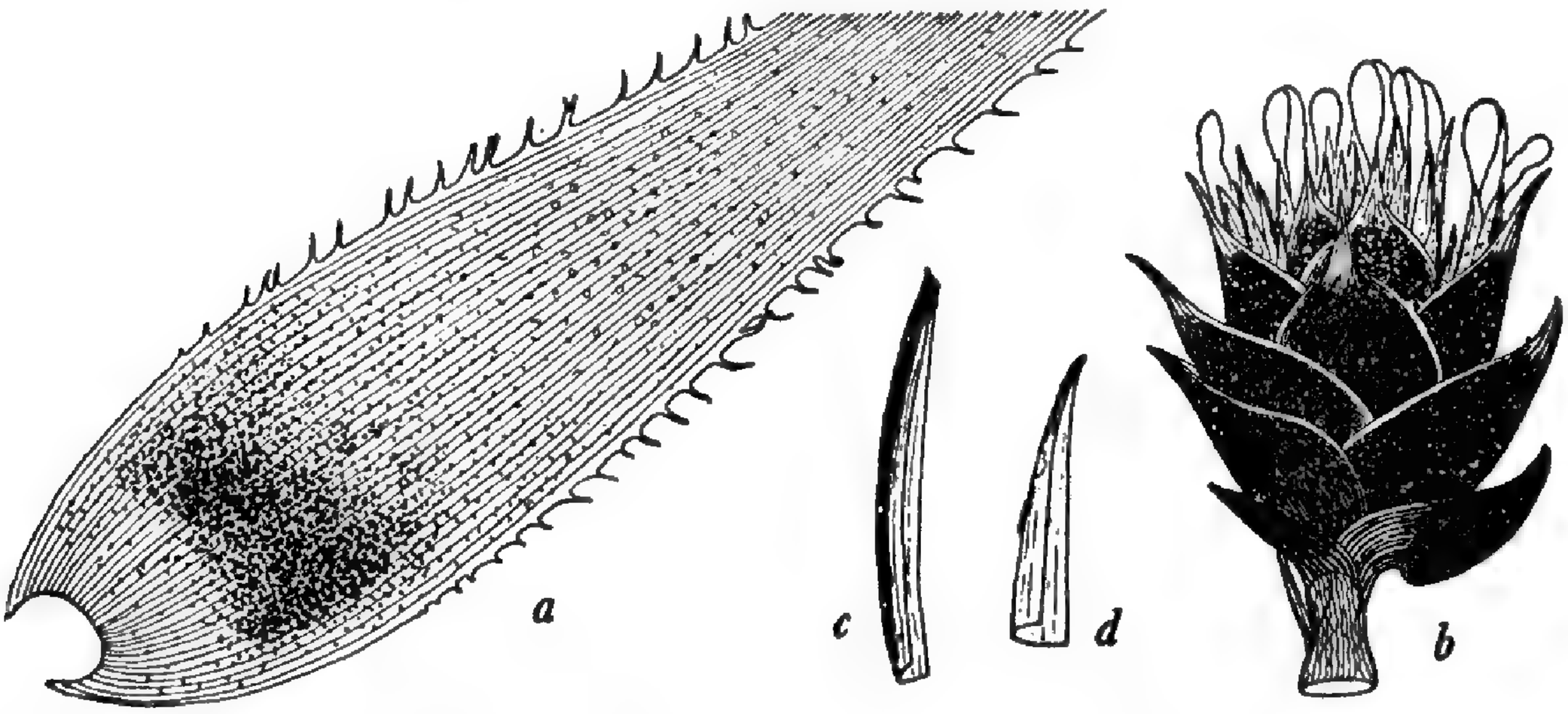

FIGURE 12.—*Greigia mulfordii: a*, Base of leaf, × ½; *b*, inflorescence, × ½; *c*, floral bract, × 1; *d*, sepal, × 1.

Greigia nubigena L. B. Smith, sp. nov. FIGURE 13

Laminis foliorum ad 23 mm. latis, basi angustatis et cum apice vaginarum spinis gracilibus ad 5 mm. longis dense armatis; inflorescentiis paucifloris; bracteis primariis exterioribus integris, interioribus spinulis paucis nonnunquam praeditis; sepalis 11 mm. longis.

Terrestrial, growing in dense masses, 45–60 cm. high (! Foster); leaves 30–45 cm. long (! Foster), the sheaths broadly elliptic, 5 cm. long, dark castaneous, the blades linear, acuminate, 23 mm. wide, at base narrowed and bearing close-ranked slender spines 5 mm. long, elsewhere sparsely and obscurely serrulate; tomentose-lepidote above

(! Foster), soon glabrous throughout; inflorescences probably lateral, few-flowered, dense, compressed, 4 cm. long; primary bracts broadly elliptic, thick-subulate at apex, 25–30 mm. long, much exceeding the sepals, the center and apex coriaceous and castaneous, elsewhere thin and green, sparsely appressed-brown-lepidote, the outer ones entire, the inner sometimes bearing a few minute teeth; floral bracts broadly lanceolate, 22 mm. long, membranaceous except for the thick-subulate apex, entire, sparsely lepidote; flowers sessile; sepals triangular-ovate, acute, 11 mm. long, thin, sparsely lepidote; petals 22 mm. long, nearly white (! Foster), lepidote outside.

Type in the Gray Herbarium, collected in moist places, páramo cloud-forest, Alto de Cruz above Encano, Territory of Putumayo, Colombia, altitude 3,300 meters, November 1, 1946, by M. B. and R. Foster (No. 2043).

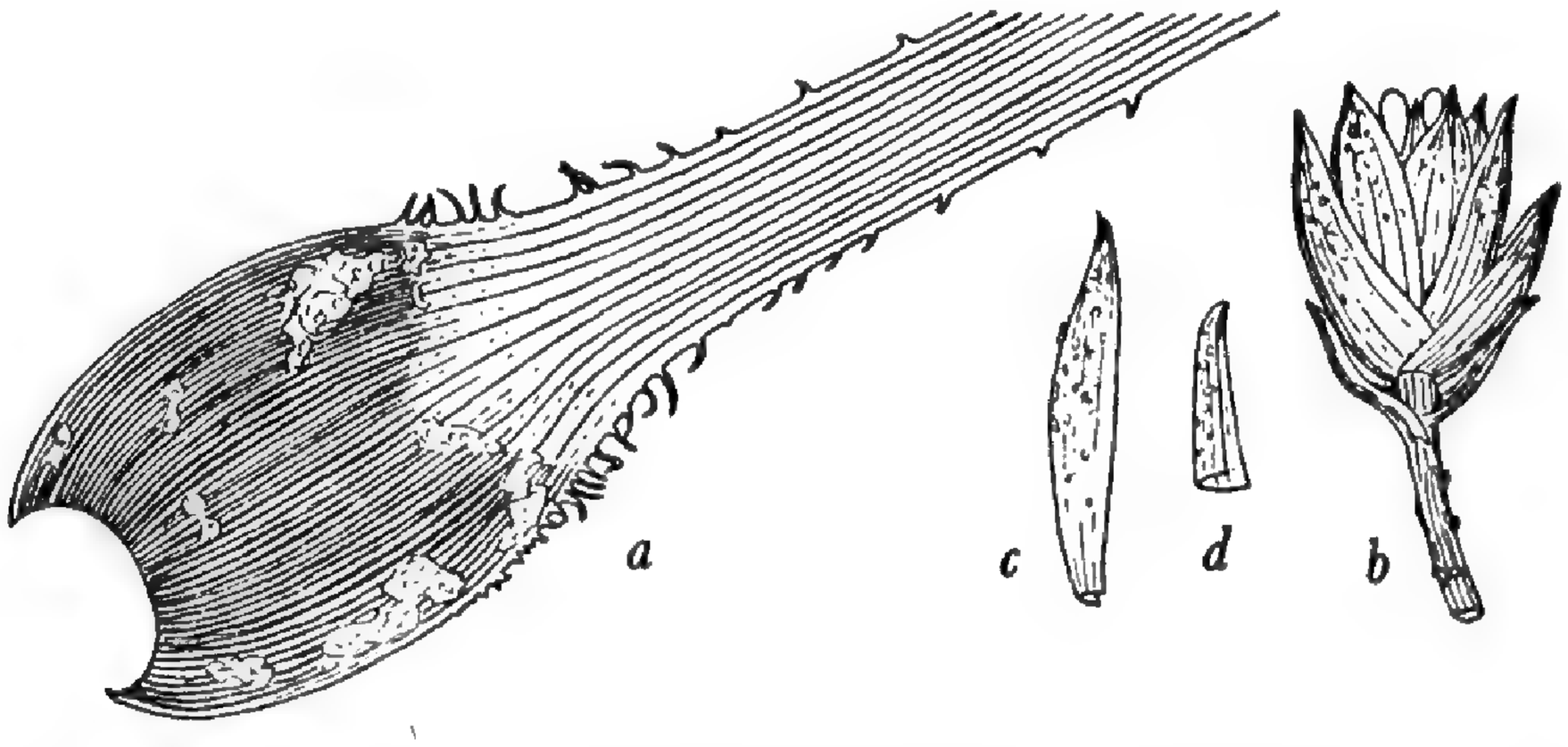

FIGURE 13.—*Greigia nubigena: a*, Base of leaf, × ½; *b*, inflorescence, × ½; *c*, floral bract, × 1; *d*, sepal, × 1.

Greigia racinae L. B. Smith, sp. nov. FIGURE 14

Foliis laxe perobscureque serrulatis, laminis ca. 2 cm. latis, supra dense cinereo-pruinosis; inflorescentiis paucifloris, verisimiliter simplicibus; sepalis 10 mm. longis.

Terrestrial, growing in dense masses (! Foster); leaves 3–4 dm. long, laxly and very obscurely serrulate, the sheaths elliptic, 6–7 cm. long, brown except for the green apex, covered with coarse pale strongly appressed scales, the blades linear, acuminate to a subulate thickened apex, 2 cm. wide, slightly narrowed at base, strongly revolute when dry, densely cinereous-pruinose above, glabrous beneath; inflorescences lateral, numerous, few-flowered, apparently simple, compressed, 3 cm. long; bracts broadly elliptic, 15–23 mm. long, exceeding the sepals, pale and membranaceous except for the castaneous keel and the subconical apex, brown-lepidote, entire; flowers sessile; sepals triangular-ovate, acute, 10 mm. long, green except for the castaneous apex, sparsely lepidote; petals 25 mm. long, pale lilac (! Foster), lepidote outside.

Type in the Gray Herbarium, collected in páramo cloud-forest, Alto de Cruz, above Encano, Territory of Putumayo, Colombia, altitude 3,300 meters, November 1, 1946, by M. B. and R. Foster (No. 2044).

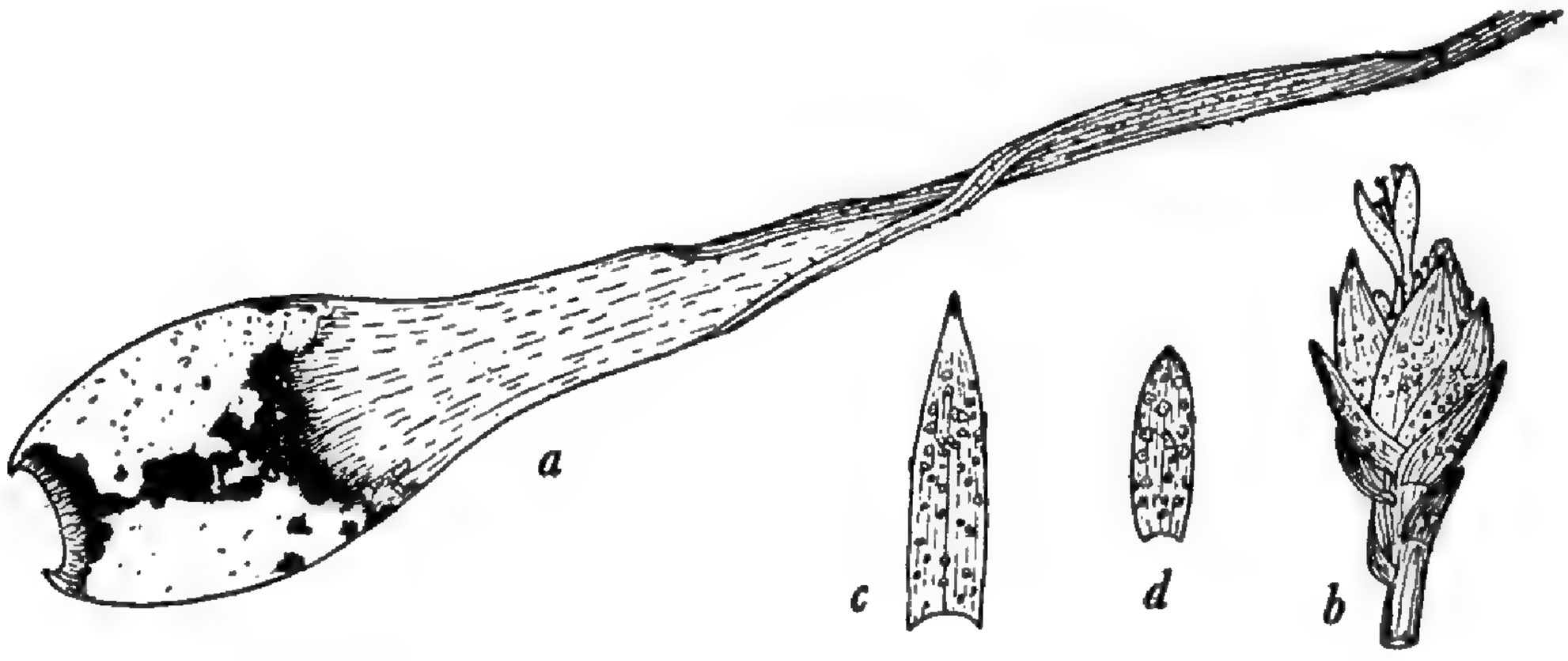

FIGURE 14.—*Greigia racinae: a*, Base of leaf, × ½; *b*, inflorescence, × ½; *c*, floral bract, × 1; *d*, sepal, × 1.

Greigia sanctae-martae L. B. Smith, sp. nov. FIGURE 15

Caulescens, 1.2–1.35 m. alta; foliorum laminis ad 35 mm. latis; inflorescentiis multifloris; bracteis primariis ad apicem versus dense serrulatis viridibusque, basi fere albis; sepalis 16–20 mm. longis.

Terrestrial, caulescent, 1.2–1.35 meters high (! Foster); leaves 1.5–2.5 meters long (! Foster), green throughout, glabrous above, the sheaths elliptic, entire, covered beneath with dark ferruginous scales, the blades linear, acuminate, to 35 mm. wide, narrowed at base, densely white-pruinose beneath, very laxly serrate with spines 1 mm.

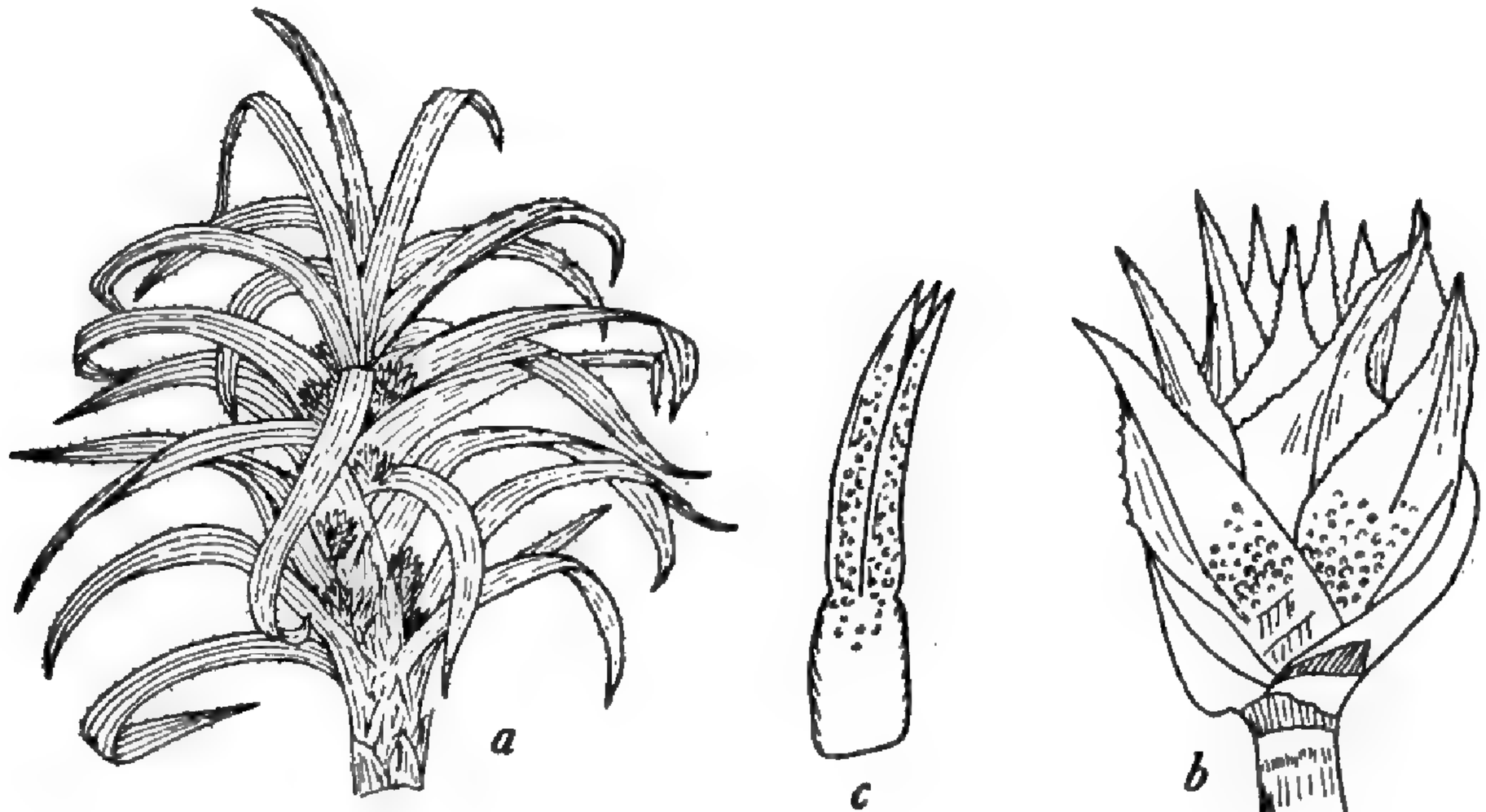

FIGURE 15.—*Greigia sanctae-martae: a*, Habit, ×1/20; *b*, inflorescence, ×½; *c*, flower, ×1. (All after M. B. Foster.)

long; inflorescences lateral, numerous, compressed, many-flowered, 4–6 cm. long; primary bracts broadly ovate or elliptic with narrowly triangular apex, 6 cm. long, exceeding the sepals at anthesis, toward apex green, densely serrulate, and white-lepidote, toward base nearly white, entire, and ferruginous-lepidote, subcoriaceous; floral bracts broadly lanceolate, acuminate, 25 mm. long, entire, green at apex and keel, elsewhere white, sparsely lepidote; flowers sessile; sepals like the floral bracts, 16–20 mm. long; petals brown with white margins (! Foster), 22 mm. long, externally lepidote.

Type in the Gray Herbarium, collected in heavy undergrowth in heavy dark rain forests, Siminchicua, Sierra Nevada de Santa Marta, Department of Magdalena, Colombia, altitude, 2,520 meters, August 19, 1946, by M. B. and R. Foster (No. 1463).

Most collections of *Greigia* are necessarily fragmentary and frequently there is no note of the habit. Some species like *G. sanctae-martae* and *G. berteroi* have a tall stem as long or longer than the leaves, while others have a relatively short one as in *G. vulcanica*,[3] but this character is noted so rarely that it is impossible to use it in a key. A similar situation exists regarding the position of the inflorescence, so that I had to ignore it in making my first summary of the genus.[4] The form of the inflorescence varies very little, but it should be noted that it is usually compound as indicated by Harms [5] and Skottsberg.[6]

Thus a key is largely restricted to characters of leaf, bract, and flower, and new species are based on single fragmentary collections. Within such limitations the following key to all known species is presented as the simplest way of placing the new species made here:

GREIGIA

Outer bracts of the compound or rarely simple inflorescence entire.
Teeth restricted to the apical quarter of the leaf-blade.
Stem short and slender.
Primary bracts castaneous, lustrous; leaf-blades up to 48 mm. wide; sepals 25 mm. long. Chile_____*G. landbeckii* Phil.
Primary bracts pale, thin; leaf-blades not over 18 mm. wide; sepals 15 mm. long. Chile_____*G. pearcei* (H. Krause) Mez
Stem over 1 m. long and 3 cm. thick, woody; leaf-blades not over 18 mm. wide; sepals 17–20 mm. long. Juan Fernández
G. berteroi Skottsb.
Teeth not restricted to the apical quarter of the leaf-blade.
Leaf-blades 40–50 mm. wide.
Primary bracts barely exceeding the ovaries; leaf-blades serrate throughout. Colombia_____*G. exserta* L. B. Sm.

[3] André, Bromel. Andr. *pl. 2.* 1889.
[4] Contr. Gray Herb. **98:** 8. 1932.
[5] Engl. & Prantl, Pflanzenfam. ed. 2, **15a.** 136. 1930.
[6] Act. Hort. Gothoburg. **11:** 211. 1936.

Primary bracts exceeding the sepals; leaf-blades serrate only toward base. Colombia.....(*G. mulfordii* L. B. Sm.)[7]

Leaf-blades not over 25 mm. wide.

Sepals 15–16 mm. long; leaf-blades flat.

Leaf-blades glabrous, leaf-sheaths subdensely brown-lepidote beneath with distinct scales; sepals coriaceous, even, castaneous. Colombia.....*G. danielii* L. B. Sm.

Leaf-blades and sheaths densely cinereous-lepidote beneath; sepals, thin, nerved, pale. Colombia..*G. collina* L. B. Sm.

Sepals 10–11 mm. long; leaf-blades revolute.

Leaf-blades minutely serrulate with teeth less than 0.5 mm. long, densely cinereous-lepidote above. Colombia
G. racinae L. B. Sm.

Leaf-blades with slender basal spines up to 5 mm. long; sparsely lepidote and soon glabrous above. Colombia
G. nubigena L. B. Sm.

Outer bracts of the compound inflorescence serrate.

Sepals 40 mm. long, connate at base, ecarinate, white. Chile
G. sphacelata (R. & P.) Regel

Sepals not more than 23 mm. long.

Leaf-blades coarsely and subdensely serrate.

Primary bracts with long narrowly triangular serrate green apices. Colombia.....*G. columbiana* L. B. Sm.

Primary bracts with short scarcely differentiated apices.

Primary bracts barely exceeding the ovaries, sparsely serrate. Colombia.....*G. exserta* L. B. Sm.

Primary bracts equaling or exceeding the ovaries.

Leaf-bracts coarsely serrate throughout; nearly or all the margin of the primary bracts serrate; sepals asymmetric. Colombia.....*G. vulcanica* André

Leaf-blades coarsely serrate only at base; primary bracts serrate only near apex; sepals asymmetric. Colombia
G. mulfordii L. B. Sm.

Leaf-blades finely and remotely serrulate.

Teeth restricted to the apical quarter of the leaf-blade.

Leaf-blades not over 18 mm. wide; stem over 1 m. tall and 3 cm. thick. Juan Fernández.....*G. berteroi* Skottsb.

Leaf-blades to 28 mm. wide; plant slender. Ecuador
G. sodiroana Mez

Teeth not restricted to the apical quarter of the leaf-blade.

Primary bracts castaneous toward apex or throughout; leaf-blades not over 30 mm. wide.

Floral bracts and sepals wholly castaneous; leaf-blades sometimes bearing a few teeth at the base as well as at the apex. Ecuador.....*G. sodiroana* Mez

Floral bracts and sepals castaneous only toward the apex.

Floral bracts 35 mm. long, exceeding the sepals; mucro of sepals subapical. Peru..*G. macbrideana* L. B. Sm.

Floral bracts 26 mm. long, exceeded by the sepals; mucro of the sepals terminal. Guatemala
G. steyermarkii L. B. Sm.

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[7] The teeth on the outer bracts of *G. mulfordii* are so rare as to make it seem probable that they may be entirely lacking in further collections.

Primary bracts pale toward apex.
Leaf-blades not over 20 mm. wide; primary bracts with a long narrowly triangular apex. Costa Rica
G. sylvicola Standl.
Leaf-blades over 30 mm. wide; primary bracts with short scarcely differentiated apices.
Primary bracts and sepals castaneous toward base; plant subacaulescent. Venezuela
G. albo-rosea (Griseb.) Mez
Primary bracts and sepals wholly green; plant 12 dm. high or more. Colombia
G. sanctae-martae L. B. Sm.

Guzmania amplectens L. B. Smith, sp. nov. FIGURE 16

Foliorum laminis ligulatis; acuminatis; scapi bracteis imbricatis; inflorescentia bipinnatim paniculata; bracteis primariis quam spicis densifloris subduplo brevioribus; bracteis florigeris oblongo-ellipticis, sepala multo superantibus, ecarinatis; floribus erectis sed per anthesin subsecundis; sepalis ellipticis, 30 mm. longis.

Terrestrial, flowering plant up to 1 meter high (! Foster); leaves rosulate, 4–5 dm. long, subdensely lepidote throughout with small pale appressed scales, the sheaths elliptic, distinct, dark castaneous, the blades ligulate, acuminate, 25 mm. wide; scape erect, about 7 mm. thick when dry, glabrous; scape-bracts erect, densely imbricate, the lower foliaceous, the upper broadly ovate, acuminate; inflorescence bipinnate, 35 cm. long; primary bracts like the upper scape-bracts, about half as long as the spikes; spikes erect but subsecund, short-stipitate, slenderly ellipsoid, dense, 10 cm. long, 2–3 cm. in diameter; floral bracts at first enfolding the whole diameter of the spike, later as they diverge enfolding merely a single axillary flower each, oblong-

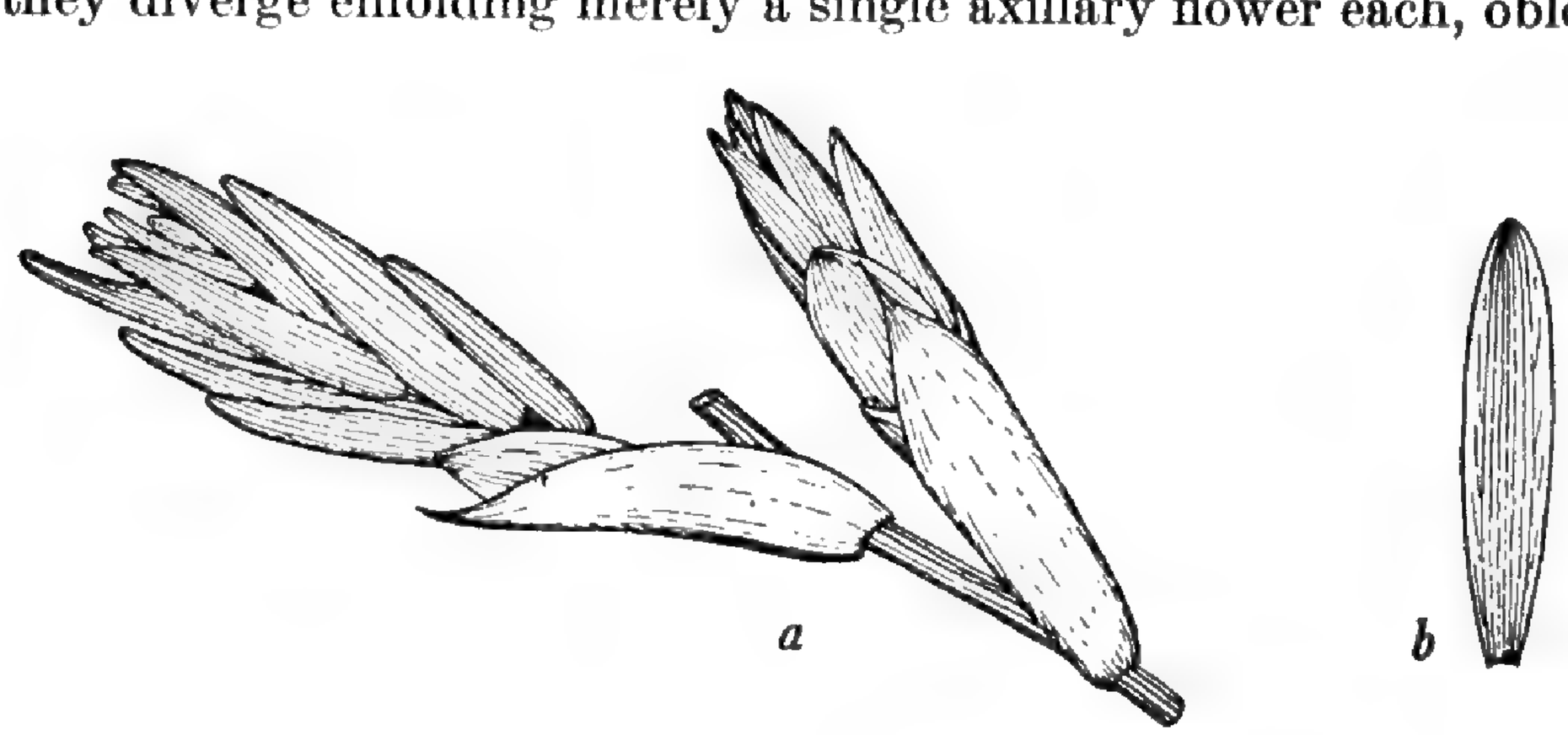

FIGURE 16.—*Guzmania amplectens: a*, Branches of inflorescence, × ½; *b*, sepal, × 1.

elliptic, 48 mm. long, much exceeding the sepals, ecarinate, obscurely pale-appressed-lepidote, bright red except for the orange apex, the center subcoriaceous, the margins membranaceous; flowers subsessile, erect but subsecund at anthesis; sepals elliptic, obtuse, 30 mm. long,

sparsely white-lepidote, the posterior ones carinate, connate for 8 mm. with each other and for 4 mm. with the ecarinate anterior one.

Type in the Gray Herbarium, collected near Junín, Department of Nariño, Colombia, altitude 840 meters, November 14, 1946, by M. B. and R. Foster (No. 2169). Duplicate in U. S. National Herbarium.

In the Pflanzenreich *Guzmania amplectens* keys out to the vicinity of *G. splitgerberi* Mez and *G. altsonii* L. B. Smith. From the first it differs in its ecarinate floral bracts and from the second in its much larger sepals. Since it has not been possible to examine good corollas of *G. amplectens*, it cannot be assigned to this genus with complete certainty. There is a possibility it might belong to *Mezobromelia*.

Guzmania musaica (Linden & André) Mez var. **concolor** L. B. Smith, var. nov.

A var. typica differt laminis foliorum omnino viridibus, nullo modo pictis; floribus minoribus.

Differs from the typical variety in its concolorous green leaf-blades and smaller flowers; sepals 32 mm. long, connate for 10 mm.

Type in the Gray Herbarium, collected on trees at Buenaventura, Department of El Valle, Colombia, altitude 15 meters, December 5, 1946, by M. B. and R. Foster (No. 2335).

Although this variety differs chiefly in the color of its leaves, their uniform green makes a striking contrast with the beautiful penciling of the typical form.

Guzmania pungens L. B. Smith, sp. nov. FIGURE 17

Foliorum laminis ligulatis, acuminatis, apice valde incrassatis; scapi bracteis imbricatis; inflorescentia laxe paniculata; bracteis primariis infimis verisimiliter spicas fere aequantibus; spicis ad 3 cm. stipitatis; bracteis florigeris tenuibus, sepala aequantibus vel brevioribus; sepalis anguste lanceolatis, tenuibus.

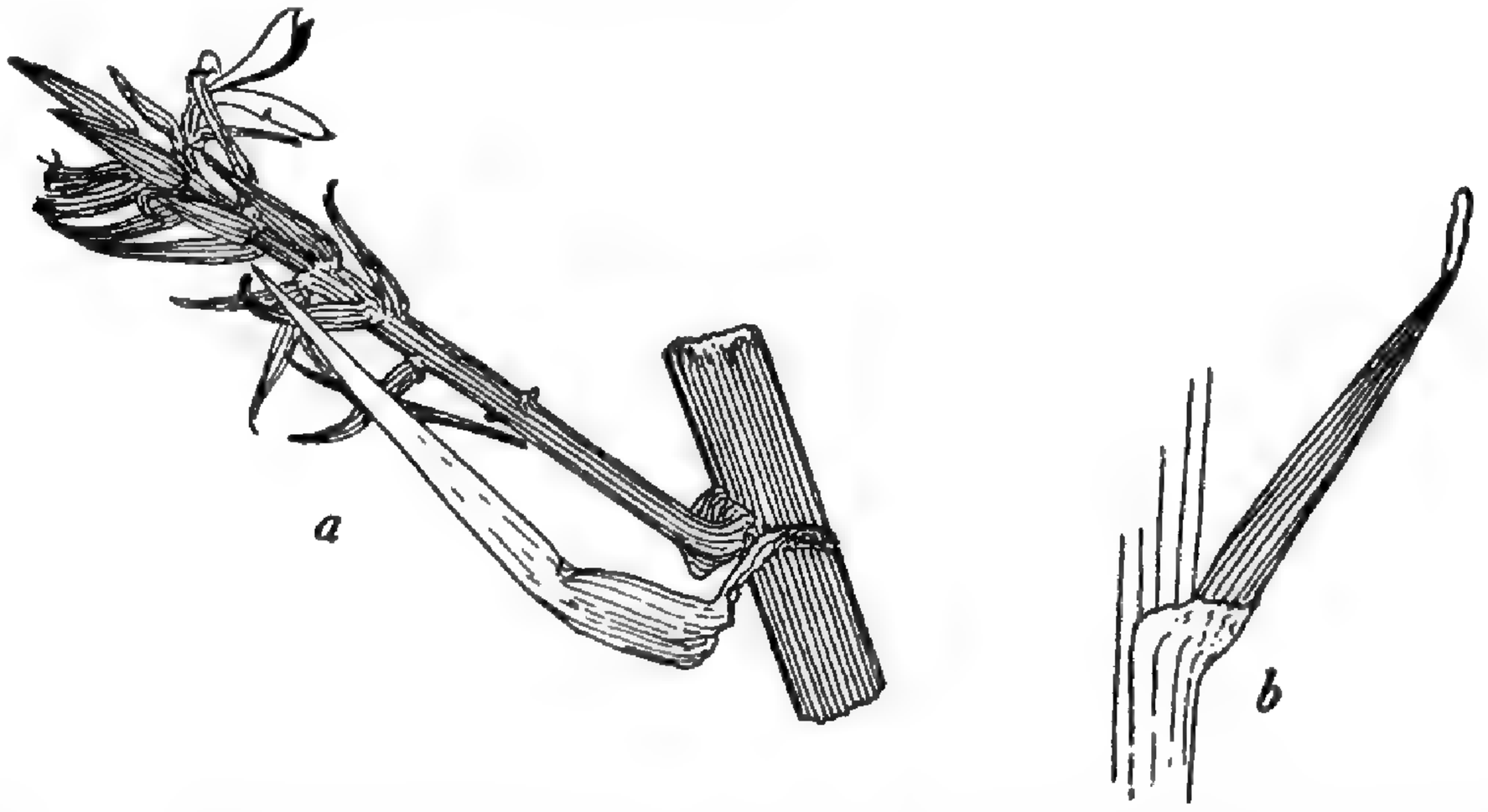

FIGURE 17.—*Guzmania pungens: a*, Branch of inflorescence, × ½; *b*, flower and bract, × 1.

Flowering plant 1.5 meters high or more; leaves 9–12 dm. long (! Foster), the sheaths large, elliptic, the blades ligulate, about 9 cm. wide, acuminate to a strongly thickened pungent apex, minutely appressed-lepidote throughout; scape erect, stout; scape-bracts foliaceous, erect, densely imbricate; inflorescence laxly bipinnate; primary bracts narrowly lanceolate, acuminate, pungent, the lowest probably almost equaling the spikes, the upper much shorter; spikes suberect, stipitate for 3 cm., cylindric, subdense, 8 cm. long; floral bracts thin, known only from remnants, apparently lanceolate and equaling the sepals or shorter; flowers suberect, subsessile; sepals narrowly lanceolate, acute, 25 mm. long, ecarinate, thin, nerved, probably glabrous; petals and stamens unknown; capsule slenderly ellipsoid, 28 mm. long.

Type in the Gray Herbarium, collected above El Diviso, Department of Nariño, Colombia, altitude 705 meters, November 13, 1946, by M. B. and R. Foster (No. 2156). Duplicate in U. S. National Herbarium.

The only material of *Guzmania pungens* is so old and battered that the exact relationship of the species is uncertain. The remains of the flowers and bracts appear much like those of *G. plumieri* (Griseb.) Mez of the Lesser Antilles, as do also the curiously thickened tips of the leaves and primary bracts. Unlike *G. plumieri*, however, the spikes are long-stipitate with a stout rhachis and the flowers show no tendency to become secund.

Guzmania radiata L. B. Smith, sp. nov. FIGURE 18

Acaulis; foliorum laminis ligulatis, acuminatis; scapi bracteis imbricatis; inflorescentia laxissime paniculata; spicis patentibus, manifeste stipitatis, laxe 3–6–floris; bracteis florigeris quam sepalis subduplo brevioribus, margine late crispatis; sepalis anguste oblongis, 31 mm. longis, margine crispatis.

Aggregated, flowering plant 1 meter high; leaves densely rosulate, 6 dm. long, minutely and very obscurely lepidote throughout, the sheaths elliptic, about 10 cm. long, the blades ligulate, acuminate, 25 mm. wide (! Foster), green above, reddish beneath, green-spotted on both sides (! Foster); scape erect or suberect, slender, red, pale-flocculose; scape-bracts subfoliaceous, very densely imbricate; inflorescence very laxly bipinnate, 32 cm. long, pale-flocculose; primary bracts long-acuminate from an ovate base, the lowest about equaling the branches; spikes spreading, distinctly stipitate with a sterile bract at base, laxly 3–6-flowered; floral bracts broadly obovate, truncate, 15 mm. long, ecarinate, flavous with red stripes (! Foster), nerved, the broad margin membranaceous and crisped; flowers not at all secund; pedicels 4 mm. long; sepals narrowly oblong, obtuse, 31 mm. long, nerved, equally connate for 2 mm., the margins membrana-

ceous and crisped; petals and stamens unknown; capsule subcylindric, much shorter than the sepals.

Type in the Gray Herbarium, collected on moss and stumps, at El Páramo, above Diviso, Department of Nariño, Colombia, altitude 720 meters, November 13, 1946, by M. B. and R. Foster (No. 2162). Duplicate in U. S. National Herbarium.

In its short spikes and floral bracts and long narrow sepals, *Guzmania radiata* resembles *G. lehmanniana* (Wittm.) Mez, but its flowers radiate in all directions instead of being secund, and the broad crisped margins of its floral bracts and sepals are quite unlike those of *G. lehmaniana*.

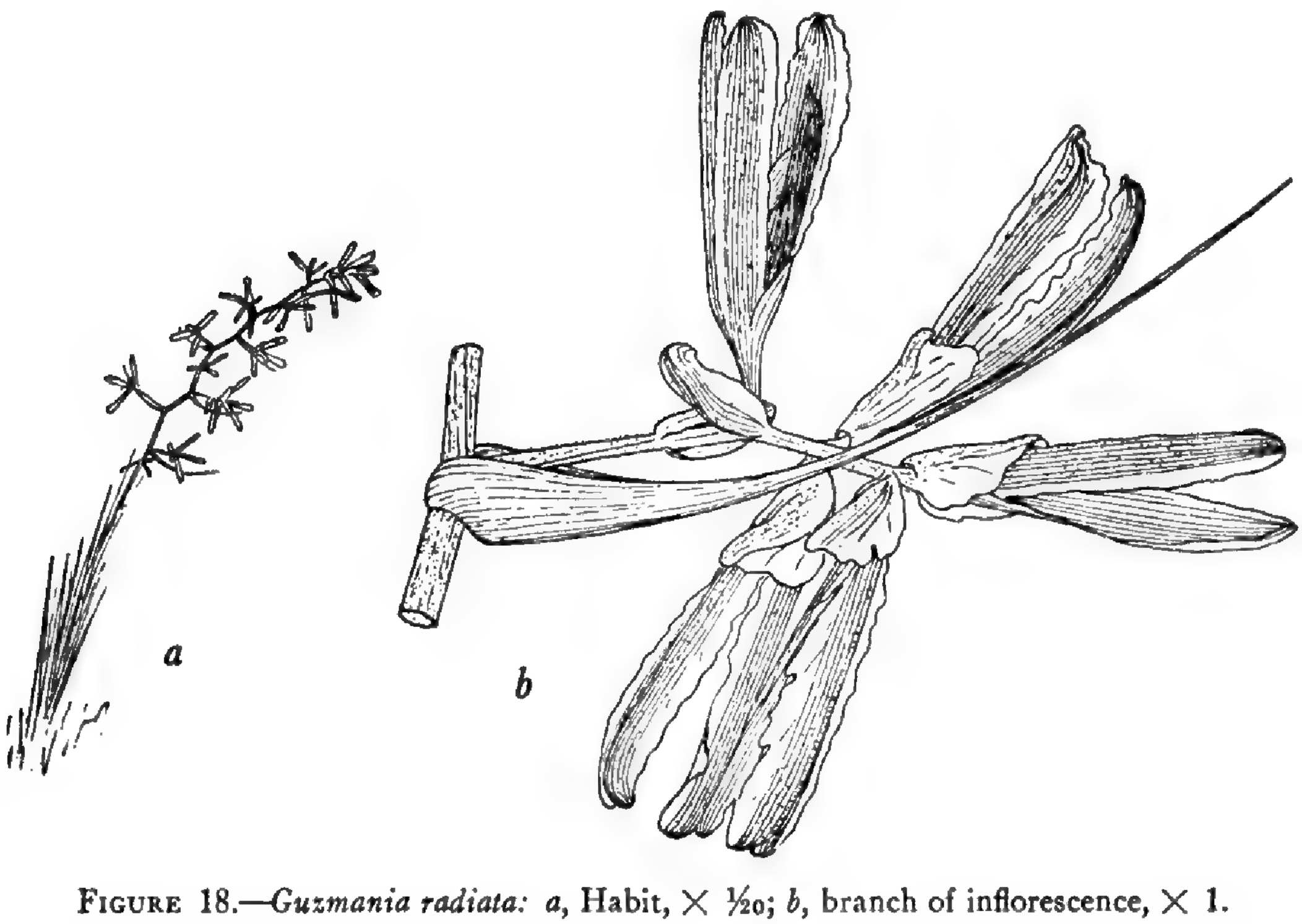

FIGURE 18.—*Guzmania radiata: a*, Habit, × 1/20; *b*, branch of inflorescence, × 1.

Guzmania rhonhofiana Harms, Notizbl. **14:** 329. 1939.

TYPE LOCALITY: San Carlos de los Colorados, Los Ríos, Ecuador. Type collected by Hertha Schultze-Rhonhof (No. 1981).

COLOMBIA:

EL VALLE: Epiphytic in forest, Cisneros, Dagua Valley, Sept. 21, 1922, *Killip* 11474 (G); epiphytic, Pacific coast, Río Naya, between Puerto Merizalde and Meregildo, to the headwaters of Río Chabirrú, alt. 5 m., Mar. 2, 1943, *Cuatrecasas* 14343 (G); epiphytic in woods, western slope of the Cordillera Occidental, valley of the Río Digua, La Elsa, alt. 1,000–1,200 m., Sept. 9, 1943, *Cuatrecasas* 15302 (G); in trees, Buenaventura, sea level, Dec. 8, 1946, *M. B. & R. Foster* 2324 (G).

NARIÑO: On trees, Ricaurte, alt. 1,200 m., Nov. 15, 1946, *M. B. & R. Foster* 2183 (G); Barbacoas, Río Nembi, alt. 450 m., Nov. 16, 1946, *M. B. & R. Foster* 2188 (G, US).

ECUADOR:

Los Ríos: Epiphytic, border of potrero, San Carlos de los Colorados, Oct. 19, 1935, *Hertha Schultze-Rhonhof* 1981 (B, type; presumably destroyed).

For some time two species have been going under the name *Guzmania roezlii*. True *G. roezlii* (E. Morr.) Mez, a species of Guiana, Peru, and Bolivia, has branches with sterile bases as long as the fertile part and usually three or four sterile bracts and floral bracts nearly as long as the ovate-obtuse sepals. The second species, which proves to be *G. rhonhofiana*, has branches with short sterile bases and only one or two sterile bracts and floral bracts not more than half as long as the oblanceolate truncate emarginate sepals.

Guzmania scherzeriana Mez in DC. Monogr. Phan. **9**: 949. 1896.

? *Guzmania herthae* Harms, Notizbl. **14**: 329. 1939.

TYPE LOCALITY: Near Cartago, Costa Rica, altitude 1,700 meters. Type collected by Scherzer.

COSTA RICA:

CARTAGO: Near Cartago, alt. 1,700 m., *Scherzer* (Vienna, probably destroyed, Macbride photo No. 29976).

PANAMA:

VERAGUAS: Forested slopes of Cerro Tute, vicinity of Santa Fé, alt. 7,500 m., Mar. 25, 1947, *Allen* 4359 (US, between typical and var. *guatemalensis*).

COLOMBIA:

EL VALLE: Epiphyte, dense forest along Río Dagua, about 20 km. east of Buenaventura, alt. 40 m., Feb. 15, 1939, *Killip & Garcia* 33327 (US); epiphyte, dense forest, Córdoba, alt. 50–100 m., Feb. 17, 1939, *Killip & Garcia* 33454 (US); epiphyte, wooded slopes, drainage of the Río Anchicayá, left bank, El Prado, alt. 250–350 m., Aug. 4, 1943, *Cuatrecasas* 14848 (G); Silva, Pacific coast, Río Cajambre, alt. 5–80 m., May 5–15, 1944, *Cuatrecasas* 17618 (G); epiphyte, dense forest, Agua Clara, along highway from Buenaventura to Cali, alt. 100 m., June 6, 1944, *Killip & Cuatrecasas* 38882 (US).

NARIÑO: Dense forest along stream, east side of Gorgona Island, alt. 50–100 m., Feb. 11, 1939, *Killip & Garcia* 33187 (US).

ECUADOR:

Los Ríos: Epiphytic, rain forest, San Carlos de los Colorados, Sept. 27, 1935, *Hertha Schultze-Rhonhof* 1923 (B, type of *Guzmania herthae* Harms).

I am in the awkward position of not having seen the type of *Guzmania herthae*, and it is probable that it no longer exists. However, the material cited here forces me to reach a decision and at the same time indicates by its variation that *G. herthae* does not have sufficient distinction to warrant even varietal status.

Guzmania scherzeriana var. **guatemalensis** (L. B. Smith) L. B. Smith, comb. nov.

Guzmania guatemalensis L. B. Smith, Contr. Gray Herb. **117**: 8. *pl. 1, fig. 13.* 1937.

TYPE LOCALITY: Chamá, Alta Verapaz, Guatemala. Type collected by H. Johnson (No. 391).

GUATEMALA:

ALTA VERAPAZ: Chamá, alt. 330 m., July 26, 1920, *H. Johnson* 391 (US).

PANAMA:

COCLÉ: Epiphyte, vicinity of La Mesa, north of El Valle de Anton, alt. 1,000 m., May 12, 1941, *P. H. Allen* 2368 (US).

COLOMBIA:

EL VALLE: Epiphyte, non-inundable woods at edge of mangrove swamp, Punta Arenas, north shore of Buenaventura Bay, near sea level, June 2, 1944, *Killip & Cuatrecasas* 38644 (US); epiphytic, drainage of Río Dagua, Córdoba, alt. 39–60 m., Nov. 14, 1945, *Cuatrecasas* 19826 (CM); epiphytic, Pacific coast, Buenaventura Bay, Quebrada de Aguadulce, alt. 0–10 m., Feb. 24, 1946, *Cuatrecasas* 19997 (CM); on trees, above Buenaventura, alt. 30 m., Dec. 8, 1946, *M. B. & R. Foster* 2326 and 2327 (G).

At the time I described *Guzmania guatemalensis* I had only a single specimen on which to base my judgment, and what then seemed sufficient to distinguish it from *G. scherzeriana* as a species assumes less significance in the light of later collections. Furthermore, the emphasis should be shifted in the variety to its lax branches, 10–13 cm. long, and divergent to spreading flowers, as contrasted with typical *G. scherzeriana* where the dense or subdense branches are 5–7 cm. or rarely up to 10 cm. long and the flowers are suberect.

Guzmania stricta L. B. Smith, sp. nov. FIGURE 19

Foliorum laminis acuminatis, valde plicatis; scapo erecto; scapi bracteis imbricatis; inflorescentia paniculata; spicis strictis vel paulo divergentibus, subdensifloris, infimis stipitatis; bracteis florigeris sepalis superatis; sepalis lanceolatis, membranaceis, posticis ad 2 mm. connatis.

Terrestrial, flowering plant over 1 meter high; leaves 12 dm. long, very minutely and obscurely lepidote, the sheaths inconspicuous, the blades linear, acuminate, 25 mm. wide, strongly plicate; scape erect, 1 cm. in diameter when dry; scape-bracts erect, densely imbricate, the lower ones foliaceous, the upper ovate, acuminate; inflorescence bipinnate, 25 cm. long, glabrous; primary bracts like the upper scape-bracts but thinner, much shorter than the axillary spikes; spikes strict or slightly divergent, cylindric, rather dense, 10 cm. long, 2–2.5 cm. in diameter, the lower distinctly stipitate; floral bracts broadly elliptic, truncate, 18 mm. long, slightly but constantly shorter than the sepals,

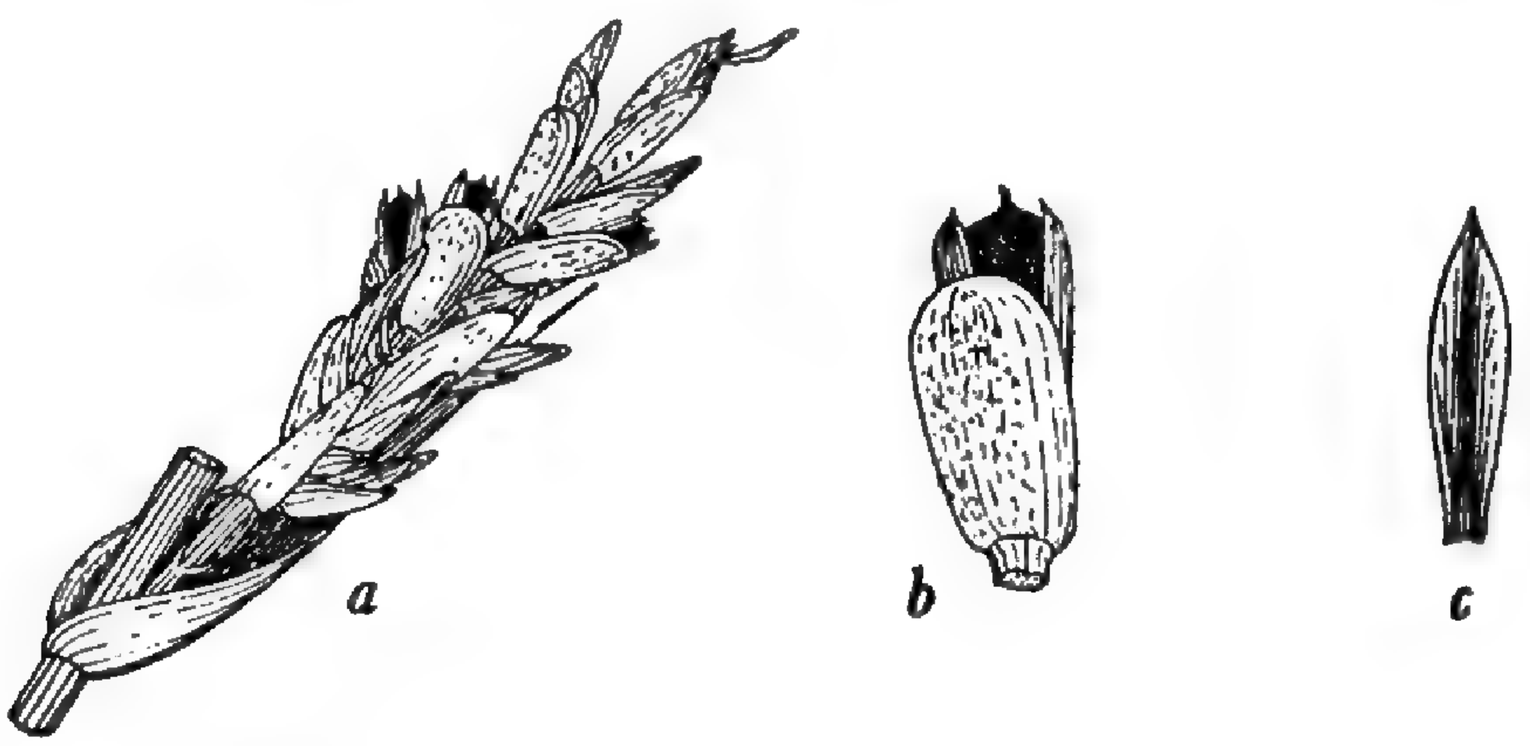

FIGURE 19.—*Guzmania stricta: a*, Branch of inflorescence, × ½; *b*, fruit and bract, × 1; *c*, sepal, × 1.

ecarinate, nerved, green, membranaceous; flowers suberect, short-pedicellate; sepals lanceolate, acute, 17 mm. long, carinate, membranaceous, yellow toward apex (! Foster), the posterior ones connate for 2 mm., the anterior subfree; petals 25 mm. long, pale yellow, the blades elliptic, obtuse; stamens included; capsule cylindric, barely exceeding the sepals.

Type in the Gray Herbarium, collected near El Páramo, above El Diviso, Department of Nariño, Colombia, altitude 720 meters, November 13, 1946, by M. B. and R. Foster (No. 2160). Duplicate in U. S. National Herbarium.

Because of its relatively short floral bracts, *Guzmania stricta* arrives in a key next to *G. patula* Mez & Wercklé, but its sepals and curious plicate leaves are almost identical with those of *G. plicatifolia* L. B. Smith.

Pitcairnia adscendens L. B. Smith, sp. nov. FIGURE 20

Foliis petiolatis, laminis oblanceolatis, ad 6 cm. latis; scapi bracteis supremis internodia subaequantibus; inflorescentia simplicissima; bracteis florigeris late ellipticis, pedicellos multo superantibus; sepalis angustissime triangularibus; petalis aureis, basi auriculis binis auctis.

Epiphytic, scandent, 2.4–6 meters long, including the 1.2 meters long flowering part (! Foster); stem branched; leaves possibly dimorphic but only large ones seen, 45–60 cm. long (! Foster), petiolate, the sheaths suborbicular, 15 mm. wide, dark castaneous, densely appressed-white-lepidote, the petioles 10 cm. long, slender, densely serrate with dark spines 2 mm. long, the blades oblanceolate, acute, 6 cm. wide, soon glabrous, reticulate beneath; scape straight, stout, flocculose; lower scape-bracts subfoliaceous, densely imbricate, the others broadly lanceolate, acute, the uppermost about equaling the internodes; inflorescence straight, simple, 75 cm. long, laxly many-flowered, flocculose; floral bracts spreading to reflexed, broadly elliptic, apiculate, 15–20 mm. long, much exceeding the pedicels, membranaceous, brown (! Foster); pedicels slender, 4 mm. long; sepals very narrowly triangular, 34 mm.

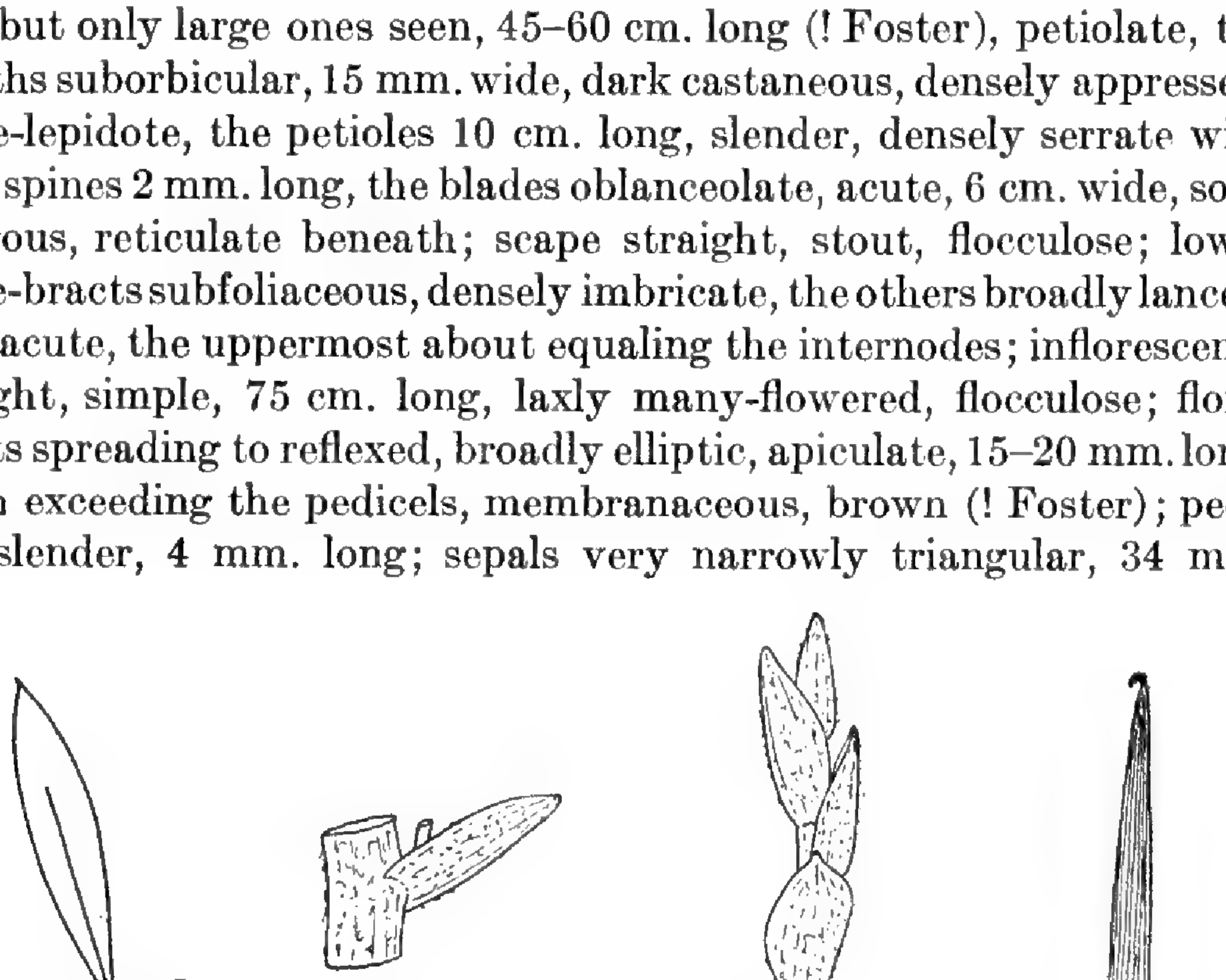

FIGURE 20.—*Pitcairnia adscendens: a*, Leaf, × 1/10; *b*, floral bract and pedicel, × 1; *c*, apex of inflorescence, × 1; *d*, sepal, × 1.

long, green; petals 85 mm. long, yellow (! Foster), bearing two auricles which are probably the remains of a deeply incised ligule; ovary three-fourths superior.

Type in the Gray Herbarium, collected at Buenaventura, Department of El Valle, Colombia, near sea level, December 8, 1946, by M. B. and R. Foster (No. 2318).

Although its petals are appendaged, *Pitcairnia adscendens* more nearly resembles *P. kalbreyeri* Bak. in the *Eligulatae* than it does any other species in the genus. However, it has much shorter pedicels than *P. kalbreyeri* and its petals are yellow.

Pitcairnia arenicola L. B. Smith, sp. nov. FIGURE 21

Foliis dimorphis, alteris persistentibus, aculeatis, reductis, alteris integerrimis, supra vaginam deciduis, laminis linearibus; scapi bracteis supremis quam internodiis paulo brevioribus; inflorescentia paupere paniculata; bracteis florigeris quam pedicellis subduplo brevioribus; sepalis obtusis; petalis luteis, ligula auctis.

Flowering plant 1 meter high; leaves fasciculate, dimorphic, some persistent, reduced to suborbicular dark castaneous brown-flocculose sheaths and short linear spinose-serrate blades, others 1.1 meters long, slightly narrowed and deciduous above the large elliptic-oblong sheath but not petiolate, glabrous, the blades linear, long-acuminate, 25 mm. wide; scape erect, slender, white-flocculose; scape-bracts very narrowly triangular, long-acuminate, the upper ones slightly shorter than the internodes; inflorescence a depauperate panicle, lax, sparsely flocculose; primary bracts like the scape-bracts, much shorter than the subdense racemes; lateral racemes 7 cm. long, the terminal 17 cm. long; floral bracts elliptic, apiculate, about half as long as the pedicels, scarious; pedicels slender, 6 mm. long; flowers divergent; sepals narrowly oblong, obtuse, 22 mm. long, carinate, nerved, red (! Foster),

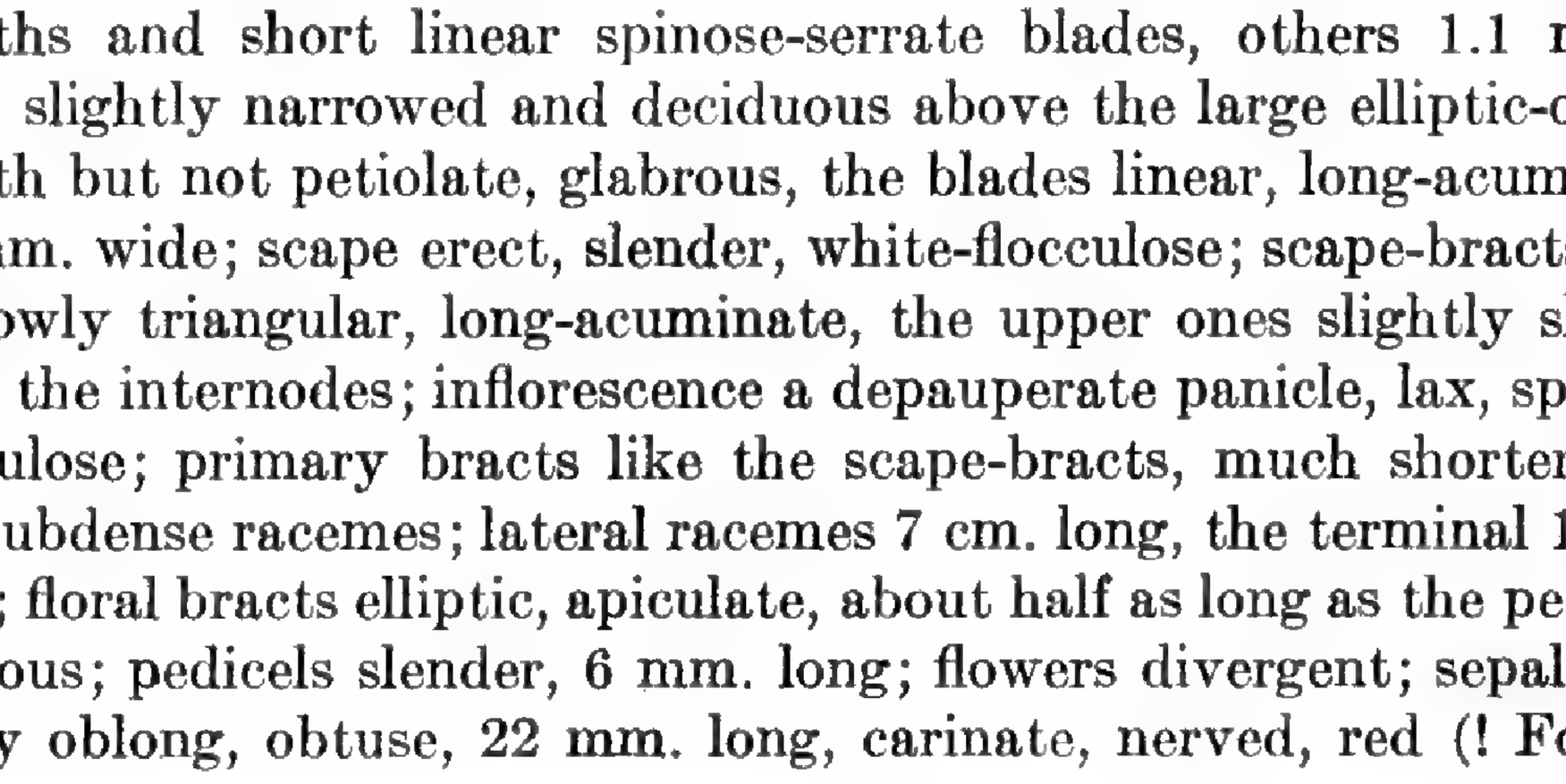

FIGURE 21.—*Pitcairnia arenicola: a*, Persistent leaf, × ½; *b*, base of deciduous leaf, × ½; *c*, flower and bract, × 1; *d*, sepal, × 1.

glabrous; petals 47 mm. long, pale yellow, bearing a ligule at base; ovary two-thirds superior; ovules caudate.

Type in the Gray Herbarium, collected on sandstone rocks in ravines, Orú on Pipeline, Department of Norte de Santander, Colombia, altitude 540 meters, September 18, 1946, by M. B. and R. Foster (No. 1733).

Because of its dimorphic partly deciduous leaves, compound inflorescence, and appendaged petals, *Pitcairnia arenicola* does not follow the Pflanzenreich key very far. If we disregard the branching of its inflorescence, it has some habital similarity to *P. camptocalyx* André but differs from it in nearly all details of the flower.

Pitcairnia bella L. B. Smith var. **densior** L. B. Smith, var. nov.

A var. typica differt scapi bracteis longioribus; sepalis haud ultra 17 mm. longis.

Differs from the typical variety in its longer scape-bracts all of which exceed the internodes and in its sepals, which are not longer than 17 mm.

Type in the Gray Herbarium, collected on rocks, at Pepino, near Mocoa, Territory of Putumayo, Colombia, altitude 1,200 meters, November 21, 1946, by M. B. and R. Foster (No. 2211). Duplicate in U. S. National Herbarium.

Pitcairnia brunnescens L. B. Smith, sp. nov. FIGURE 22

Foliorum laminis basi angustatis et spinis dense armatis sed haud petiolatis; scapi bracteis dense serratis; inflorescentia simplicissima; bracteis florigeris imbricatis, magnis, serratis; floribus graciliter pedicellatis; sepalis acuminatis, 4 cm. longis; petalis nudis, albis (! Foster); antheris 20 mm. longis.

Flowering plant over 1 meter high· stem branched (! Foster); leaves all alike, up to 1.2 meters long (! Foster), the blades linear-lanceolate, narrowed at base and bearing dark spines 5 mm. long but scarcely petiolate, entire elsewhere, acuminate, at least 4 cm. wide, soon glabrous; scape elongate, ascending; scape-bracts densely imbricate, the lower foliaceous; the upper elliptic, acute, densely serrate, green (! Foster), inconspicuously pale-flocculose; inflorescence simple, very dense, cylindric, many-flowered, 30 cm. long, 7 cm. in diameter; floral bracts erect, imbricate but with the apices spreading, lanceolate, 10 cm. long, serrate, subcoriaceous and rugulose when dry, brownish (! Foster), the bases brown-flocculose; pedicels short but slender; sepals narrowly triangular, acuminate, 4 cm. long, glabrous, green except for the dark brown apex (! Foster); petals recurved, lingulate, broadly rounded, 9–10 cm. long, 2 cm. wide, when dry, naked, white (! Foster); stamens included, the anthers 20 mm. long; ovary four-fifths superior; ovules caudate.

Type in the Gray Herbarium, collected at Sibundoy, near Buenos Aires, Territory of Putumayo, Colombia, altitude, 2,700 meters, October 29, 1946, by M. B. and R. Foster (No. 2010). Duplicate in U. S. National Herbarium.

In the Pflanzenreich, *Pitcairnia brunnescens* would fall next to *P. macranthera* André, from which it differs in its serrate scape-bracts and floral bracts, more numerous flowers in more ranks, and smaller sepals.

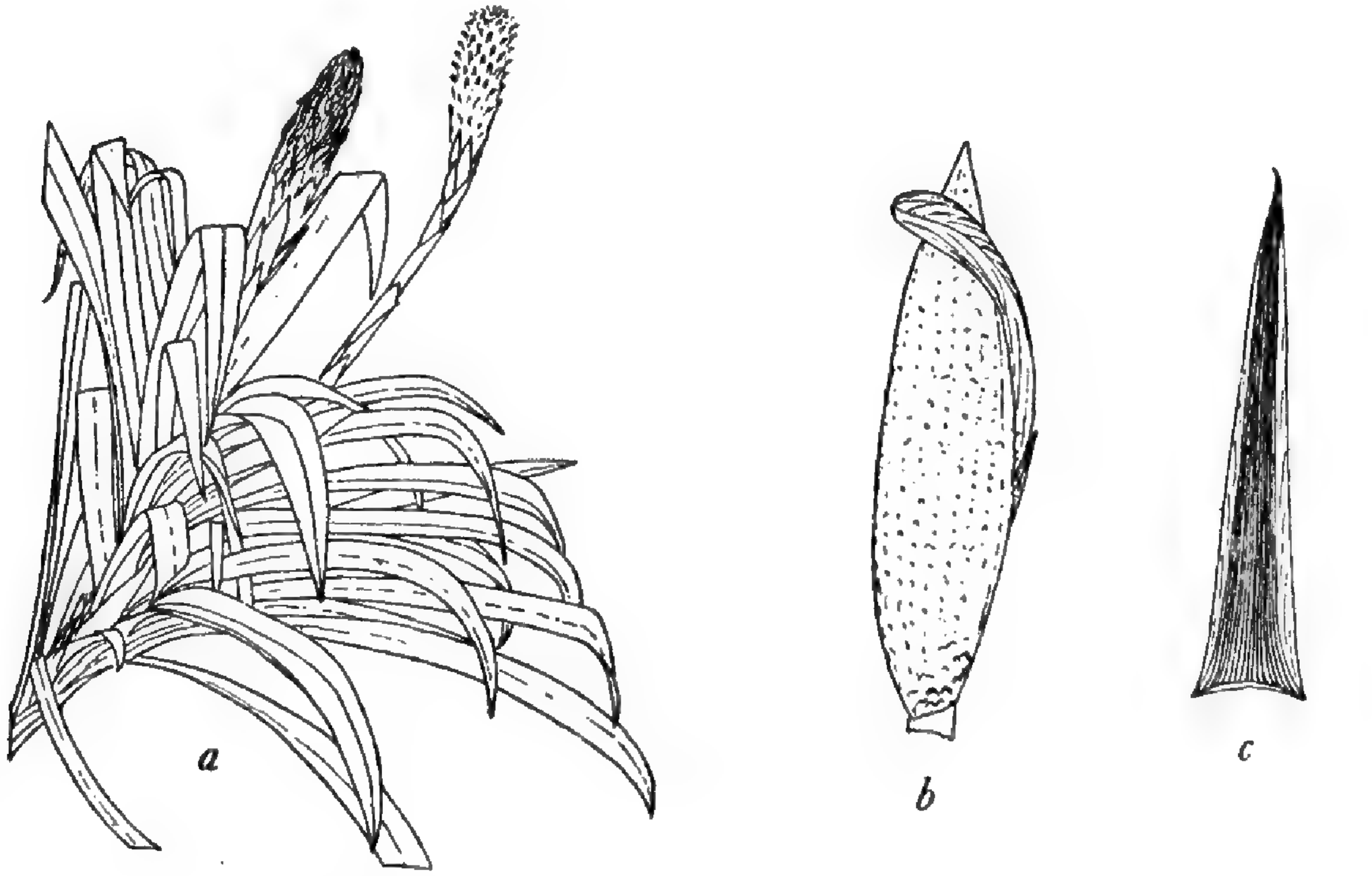

FIGURE 22.—*Pitcairnia brunnescens: a*, Habit, × 1/20; *b*, flower and bract, × 1/2; *c*, sepal, × 1

Pitcairnia capitata L. B. Smith, sp. nov. FIGURE 23

Foliis supra vaginam paulo angustatis, inermibus, laminis linearibus; scapi vaginis internodia superantibus; inflorescentia simplicissima, densissime ellipsoidea; bracteis florigeris infimis sepala superantibus; floribus graciliter pedicellatis; petalis nudis, azureis; seminibus longe caudatis.

Aggregated, subacaulescent, flowering plant 3–4 dm. high (! Foster); leaves numerous, fasciculate, uniform, slightly exceeding the inflorescence, somewhat narrowed above the sheath but not petiolate, entire, glabrous, the sheaths narrowly triangular, the blades linear, long-acuminate, 13 mm. wide; scape erect, slender, soon glabrous, red; scape-bracts erect and exceeding the internodes but not covering much of the scape, the lower subfoliaceous, the upper narrowly lanceolate, acuminate, membranaceous; inflorescence simple, densely ellipsoid, 5 cm. long, glabrous; floral bracts elliptic, acuminate, membranaceous, nerved, bright red (! Foster), the lowest exceeding the sepals, the upper shorter; pedicels short but slender; sepals oblong,

acute, 14 mm. long, strongly alate-carinate with the wings decurrent on the ovary; petals 22 mm. long, obtuse, naked, blue except for the pale margin (! Foster), about equaling the stamens; ovary four-fifths superior; seeds long-caudate.

Type in the Gray Herbarium, collected on rocks, near San Francisco, Territory of Putumayo, Colombia, altitude 2,400 meters, November 26, 1946, by M. B. and R. Foster (No. 2262).

Pitcairnia capitata is a problem. In its leaves and flowers it appears much like a number of species in subgenus *Eupitcairnia*, but because of its extremely short pedicels and dense inflorescence it must be placed in subgenus *Phlomostachys*. In addition, the blue color of its petals is an extemely rare character throughout the genus.

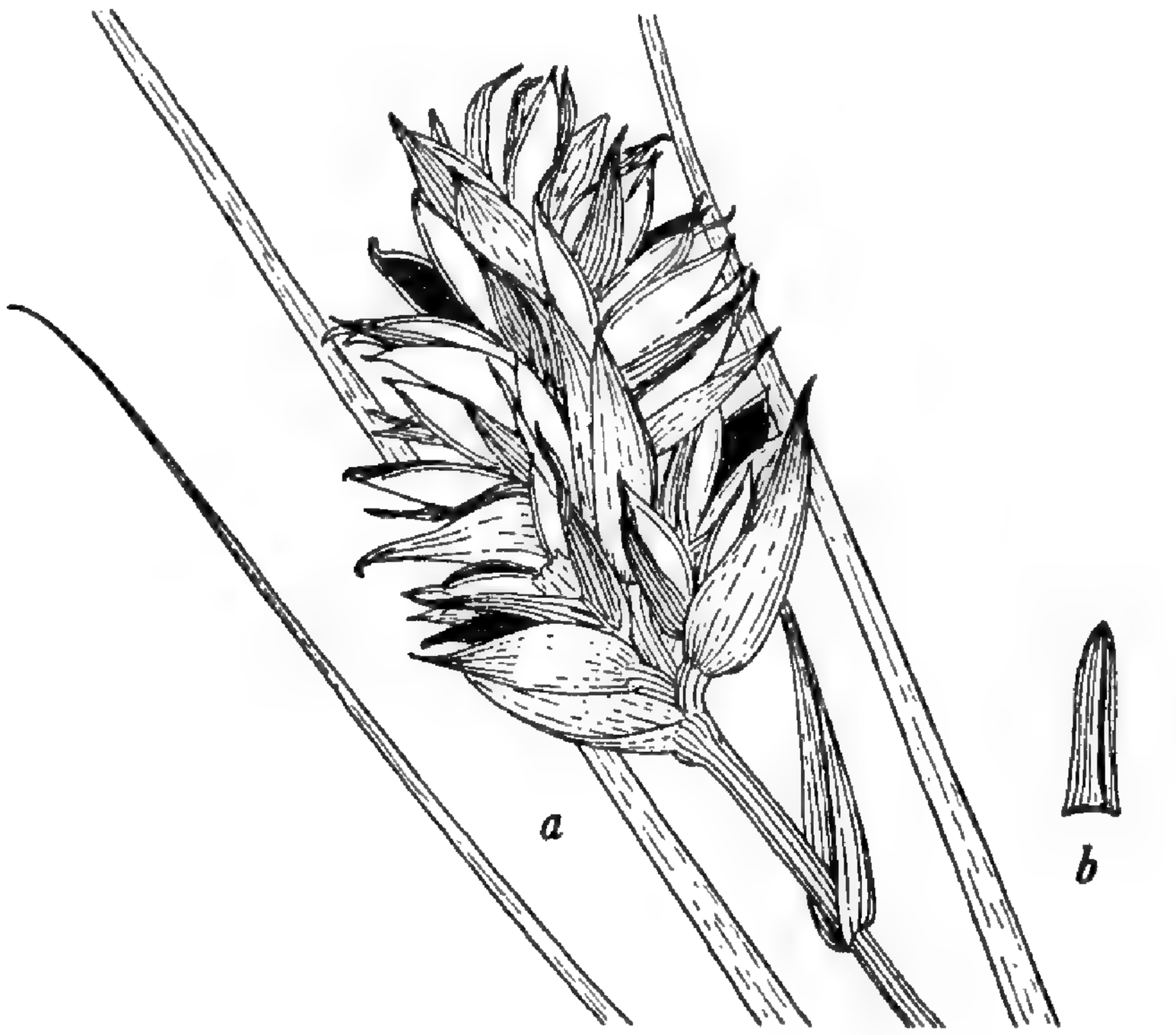

FIGURE 23.—*Pitcairnia capitata: a*, Upper part of habit, × 1; *b*, sepal, × 1.

Pitcairnia chocoensis L. B. Smith, sp. nov. FIGURE 24

Foliis integris, petiolatis, laminis lineari-lanceolatis; inflorescentia laxissime paniculata; bracteis florigeris quam pedicellis brevioribus; pedicellis 2 cm. longis, biangulatis; floribus plus minusve secundis; sepalis 38 mm. longis, glabris; petalis verisimiliter nudis.

Terrestrial, leaves persistent, entire, more than 1 meter long (! Haught), distinctly petiolate, the sheaths unknown, the blades linear-lanceolate, long-acuminate, 55 mm. wide, glabrous; scape unknown; inflorescence 1 meter high (! Haught), very laxly bipinnate, the axes slender, glabrous, bright red; primary bracts unknown, probably small; racemes ascending, very lax, 45 cm. long, the sterile

base 11 cm. long; floral bracts ovate, acute, about half as long as the pedicels; pedicels slender, 2 cm. long, biangulate, sparsely stellate-lepidote; flowers spreading, more or less secund, pale green (! Haught); sepals narrowly lanceolate, acute, 38 mm. long, ecarinate, even, glabrous; only very immature petals seen, apparently naked.

Type in the U. S. National Herbarium, No. 1903262, collected at Río Nuqui, Territory of Chocó, Colombia, January 25, 1947, by O. Haught (No. 5481).

Pitcairnia chocoensis appears more closely related to *P. spectabilis* Mez than to any other known species, but its secund flowers and much shorter pedicels give it an entirely different aspect. The strongly compressed and sharply two-edged pedicels of *P. chocoensis* are unusual in the genus.

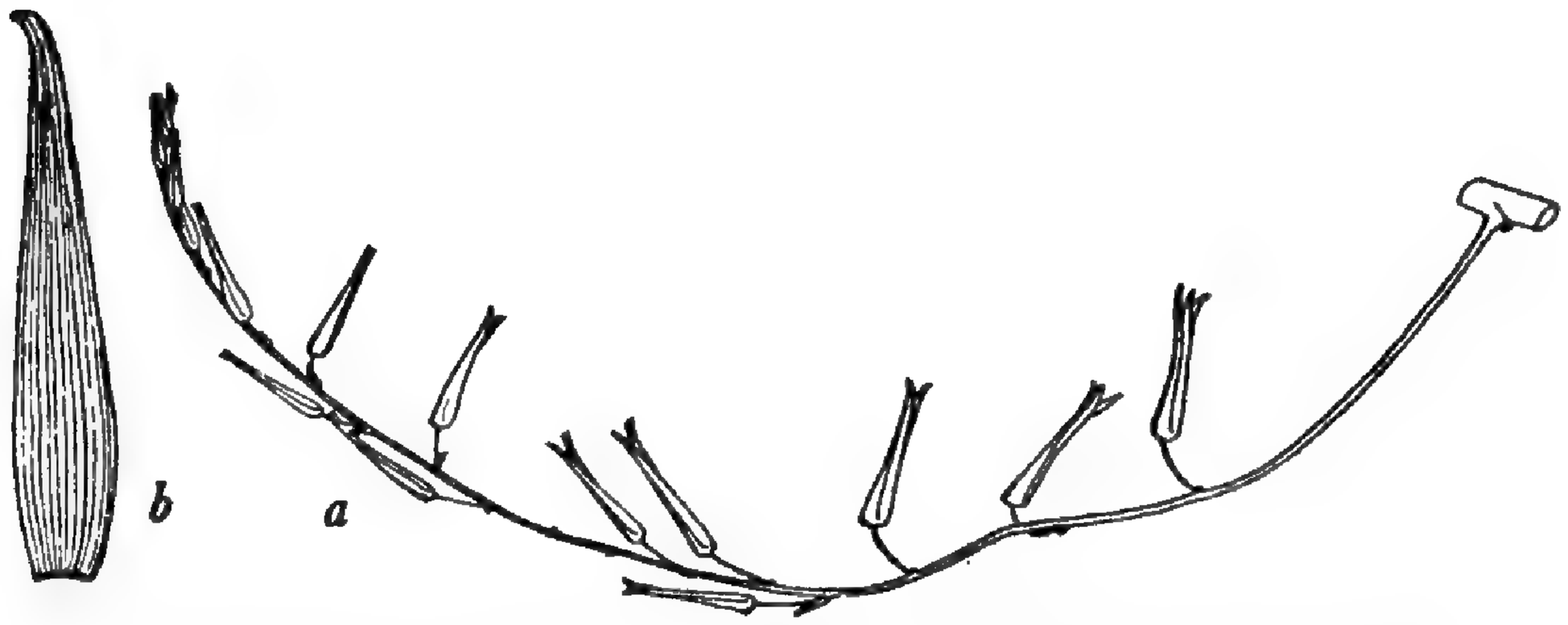

FIGURE 24.—*Pitcairnia chocoensis: a*, Branch of inflorescence, × ¼; *b*, sepal, × 1.

Pitcairnia commixta L. B. Smith, nom. nov.

Pitcairnia orgyalis sensu André, Énum. Bromél, nomen; Rev. Hortic. **60:** 564. 1888, nomen; André ex Mez in DC. Monogr. Phan. **9:** 412. 1896, not Baker, 1881.

Type in the herbarium of the Royal Botanic Gardens, Kew, collected on steep wet rocks on the left bank of Río Silante, western slope of Mount Corazón, Pichincha, Ecuador, altitude 2,500 meters; June 22, 1876, by E. André (No. 3747).

COLOMBIA:

NARIÑO: In trees, Altaquer, alt. 1050 m., Nov. 11, 1946, *M. B. & R. Foster* 2125 (G, US).

ECUADOR: *Lehmann* 7766 (B, probably destroyed; Macbride photo No. 11371).

PICHINCHA: Steep wet rocks on the left bank of Río Silante, western slope of Mount Corazón, alt. 2,500 m., June 22, 1876, *André* 3747 (K).

André misidentified his No. 3747 as *Pitcairnia orgyalis* Baker. Mez, against all rules, used the name "*orgyalis*" for André's plant after reducing "*orgyalis*" of Baker to the synonymy of another species.

Foster 2125 shows no scales on the petals, but the flowers are so old that any scales may have disappeared, and in *Pitcairnia* this character seems to be diminishing steadily in importance anyway.

Pitcairnia echinata Hook. var. **sublaevis** L. B. Smith, var. nov.

A var. typica differt sepalis ovarioque minute sparseque stellato-echinatis, fere laevibus.

Differs from the typical variety in its minutely and sparsely stellate nearly even sepals and ovary.

Type in the Gray Herbarium, collected on rocks along river near Pandi, Department of Cundinamarca, Colombia, altitude 900 meters, October 13, 1946, by M. B. and R. Foster (No. 1889).

Pitcairnia elongata L. B. Smith, sp. nov. FIGURE 25

Foliorum petiolis spinis validis armatis, laminis oblanceolatis, integris; scapo decurvato; scapi bracteis imbricatis; inflorescentia simplicissima, perelongata, basi laxa; bracteis florigeris lanceolatis, sepala multo superantibus; sepalis lanceolatis, 75 mm. longis; petalis aureis, basi ligula auctis.

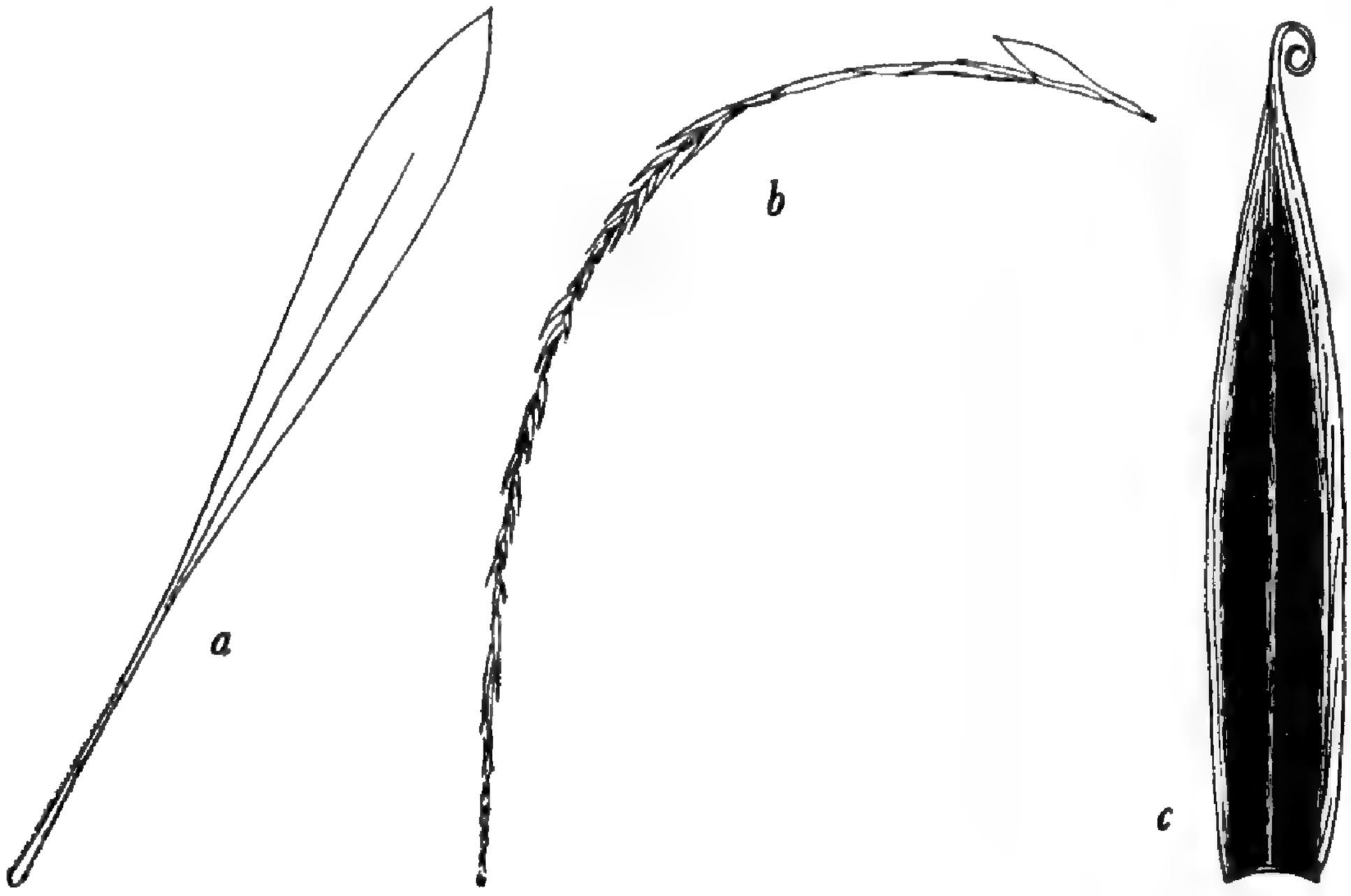

FIGURE 25.—*Pitcairnia elongata: a*, Leaf, × 1/20; *b*, scape and inflorescence, × 1/20; *c*, sepal, × 1.

Scandent, long-caulescent, flowering plant 1.8–2.1 meters long (! Foster); leaves persistent, up to 1.5 meters long, strongly petiolate, the sheaths small, broadly ovate, dark castaneous, covered with a brown membrane of coalesced scales, the petioles elongate, densely armed with dark stout often forked spines 5 mm. long, wholly brown-lepidote, the blades oblanceolate, acute, long-cuneate, 1 meter long, 15 cm. wide, glabrous, reticulate; scape decurved (! Foster), slender, densely appressed-brown-lepidote; scape-bracts densely imbricate, the lower subfoliaceous, the others broadly lanceolate, acuminate, papyraceous; inflorescence simple, elongate, slenderly cylindric, lax at the base, but the sterile or immature (! Foster) apex covered with bright

red bracts, the axis densely brown-lepidote; floral bracts over 15 cm. long, much exceeding the sepals, stramineous (! Foster); flowers erect or suberect but not imbricate or concealing the axis; pedicels very short and stout; sepals lanceolate with caudate-acuminate spirally recurved apices, 75 mm. long, coriaceous, dark castaneous except for the flavous margins and apex, glabrous; petals yellow (! Foster), densely flocculose-lepidote outside, at the base bearing a ligule 2 cm. long; stamens included, anthers linear, 25 mm. long; ovary one-half superior; ovules caudate.

Type in the Gray Herbarium, collected on mounds of shrubbery, above El Diviso, Department of Nariño, Colombia, altitude 705 meters, November 13, 1946, by M. B. and R. Foster (No. 2154).

It is enough to say that *Pitcairnia elongata* belongs to the subgenus *Neumannia*, since its lax elongate inflorescence is quite unlike anything there.

Pitcairnia fosteriana L. B. Smith, sp. nov. FIGURE 26

Foliorum petiolis spinosis, laminis anguste lanceolatis, integris; scapo elongato, adscendente; scapi bracteis imbricatis; inflorescentia dense simplicissima, dense strobiliforme, axi et florum basibus floccis atrocastaneis vestitis; bracteis florigeris sepala superantibus; pedicellis gracilibus; sepalis 5 cm. longis.

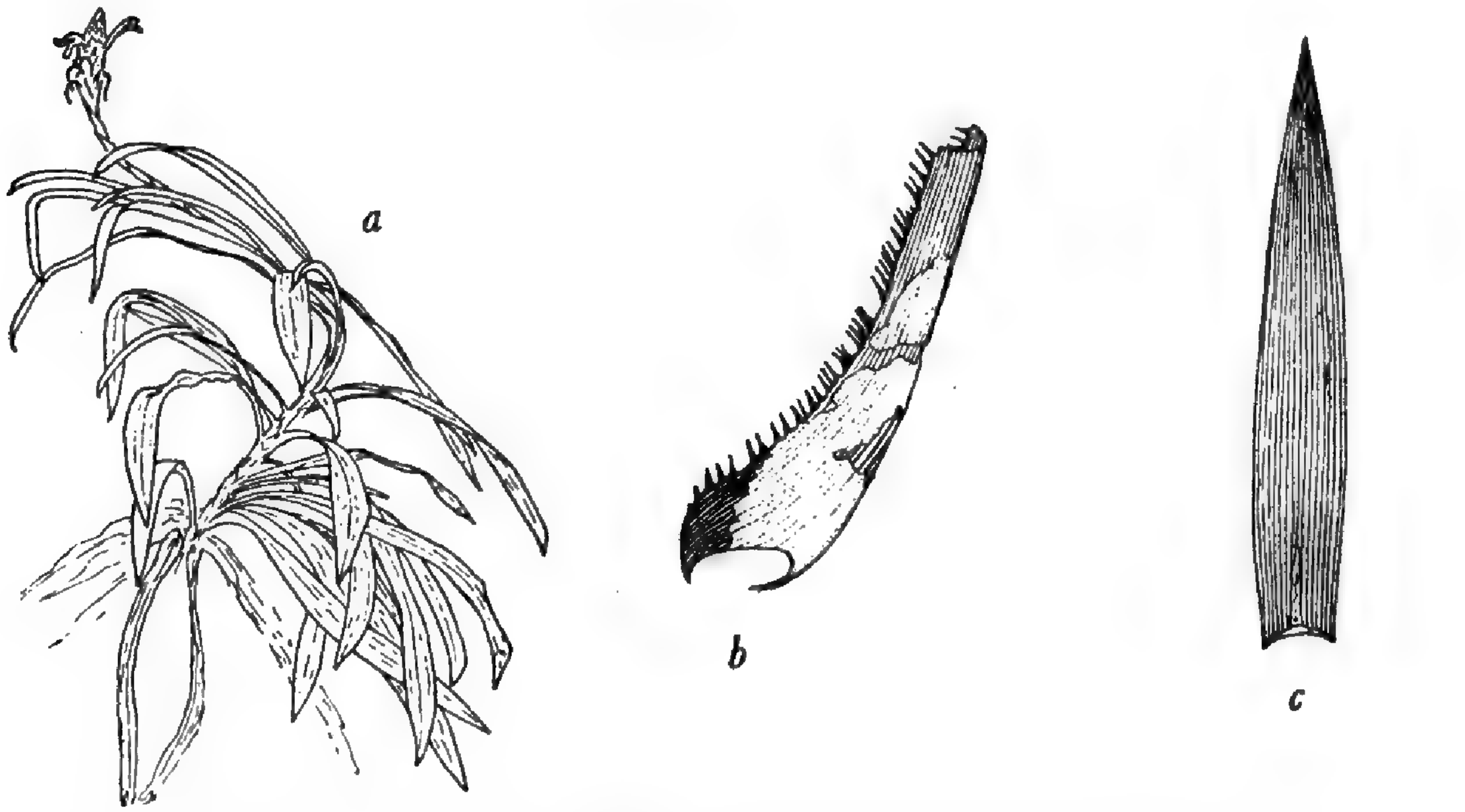

FIGURE 26.—*Pitcairnia fosteriana: a*, Habit, × 1/40; *b*, base of leaf, × 1/2; *c*, sepal, × 1.

Terrestrial, flowering plant over 2 meters high; stem stout, elongate, branched (! Foster), rather laxly foliate; leaf-sheaths broadly ovate, enfolding the stem, covered with a brown membrane of coalesced

scales, densely serrate with straight dark castaneous spines 5 mm. long, the blades persistent, dimorphic, some reduced to linear-triangular spinose-serrate spines, others green, 1.2 meters long, the petioles distinct, spinose-serrate, soon glabrous, the blades narrowly lanceolate, acuminate, 8 cm. wide, entire, glabrous; scape elongate, ascending; scape-bracts imbricate, elliptic, strongly spinose-serrate, subcoriaceous, dark castaneous, soon glabrous, the lower with long caudate blades, the upper acute and pungent; inflorescence simple, densely strobilate, fusiform, 30 cm. long, 5 cm. in diameter, the axis and the bases of the flowers covered with spreading dark castaneous scales; floral bracts straight, densely imbricate, like the upper scape-bracts, exceeding the sepals; pedicels slender; sepals linear-lanceolate, acuminate, 5 cm. long, carinate, nerved; petals 12 cm. long when dry, greenish white (! Foster), appendaged (! Foster), strongly curved; stamens slightly exserted, anthers 25 mm. long; ovary three-fifths superior; ovules caudate.

Type in the Gray Herbarium, collected near Sibundoy, Territory of Putumayo, Colombia, altitude 2,220 meters, October 29, 1946, by M. B. and R. Foster (No. 1977).

In the Pflanzenreich, *Pitcairnia fosteriana* would belong in the vicinity of *P. brongniartiana* André, but it is easily distinguished by its much larger and firmer floral bracts, which completely conceal the sepals. Field notes indicate that the petals have an appendage, but as yet I have failed to find it in the dried material.

Pitcairnia guzmanioides L.B. Smith, sp. nov. FIGURE 27

Foliis integerrimis, breviter petiolatis, laminis lineari-lanceolatis; scapi vaginis densissime imbricatis; inflorescentia simplicissima, densissime ovoidea; bracteis florigeris acuminatis, quam floribus longioribus sed valde reflexis; floribus subsessilibus; sepalis late obtusis; ovulis obtusis.

Short-caulescent; leaves few, all alike, fascicled, 7 dm. long, much exceeding the inflorescence, entire, short-petiolate, minutely white-flocculose beneath, glabrous above, the sheaths elliptic, 12 cm. long, the blades linear-lanceolate, acuminate, 35 mm. wide; scape-bracts very densely imbricate, concealing the slender scape, the lower foliaceous, the upper elliptic, acuminate, chartaceous when dry, subinflated; inflorescence simple, very dense, ovoid, 4.5 cm. long, nearly 4 cm. in diameter; floral bracts broadly ovate, acuminate, longer than the flowers but reflexed, pale below, dark red above; flowers subsessile, more than half of them open at one time; sepals subtriangular, broadly obtuse, 14 mm. long, scarcely carinate, coriaceous, coarsely nerved, sparsely flocculose; petals 25 mm. long, white; stamens included; ovary two-thirds superior; ovules obtuse.

Type in the Gray Herbarium, collected on rocks, between San Francisco and Las Mesas, Territory of Putumayo, Colombia, altitude 2,550 meters, November 26, 1946, by M. B. and R. Foster (No. 2263).

Its relatively large floral bracts, dense simple inflorescence, and subsessile flowers place *Pitcairnia guzmanioides* in the subgenus *Neumannia*, although its obtuse ovules suggest affinity with section *Schweidelleria* of subgenus *Eupitcairnia*. In either event, its reflexed floral bracts quickly distinguish it, and it seems to be without any close relative.

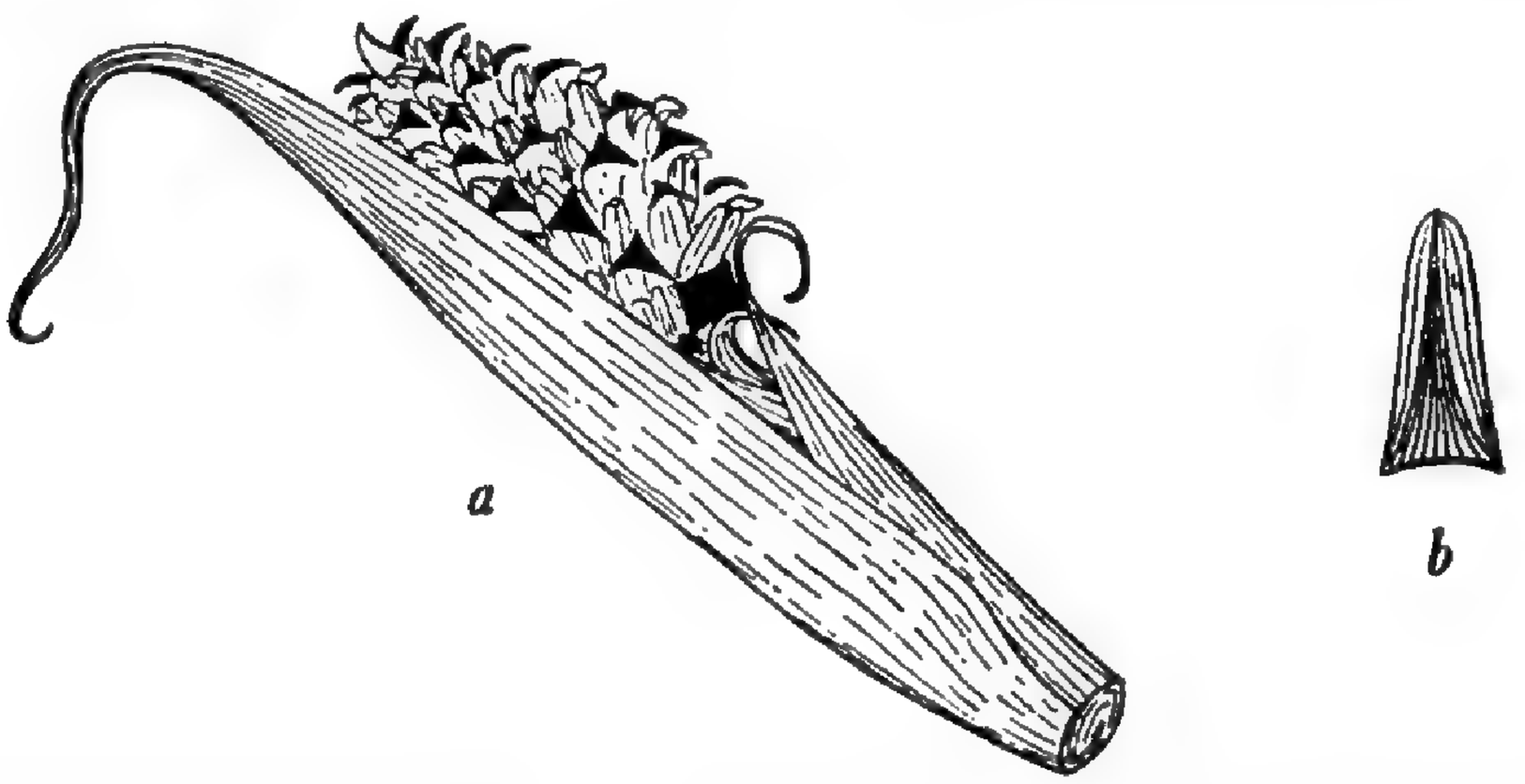

FIGURE 27.—*Pitcairnia guzmanioides: a*, Apex of scape and inflorescence, × ½; *b*, sepal × 1.

Pitcairnia haughtii L. B. Smith, sp. nov. FIGURE 28

Foliis petiolatis, integris, laminis lineari-lanceolatis, 5 cm. latis; scapi bracteis internodia multo superantibus; inflorescentia subsimplici; bracteis florigeris mox deciduis, unica cognita lanceolata, pedicellum paulo superante; sepalis anguste lanceolatis, acutis; petalis basi ligula auctis; ovario fere omnino supero, ovulis obtusis.

Terrestrial, the flowering plant about 1 meter high (! Haught); leaves few, to 1.5 meters long, petiolate, entire, glabrous, the blades linear-lanceolate, long-acuminate, 5 cm. wide; scape apparently erect or ascending, 7 mm. in diameter, densely brown-lanate; scape-bracts foliaceous and much exceeding the internodes but covering little of the scape; inflorescence subsimple with a short 2-flowered branch at base, lax, sparsely brown-flocculose, the axis slender, straight; primary bract deciduous, unknown; floral bracts quickly deciduous, the only one known lanceolate, acuminate, slightly exceeding the pedicel; flowers spreading or reflexed; pedicels slender, 2 cm. long; sepals asymmetric, narrowly lanceolate, acute, 50 mm. long, green; petals linear-spatulate, broadly rounded and apiculate, 8 cm. long, red, bearing a large truncate scale at base; stamens included; ovary almost wholly superior, the ovules obtuse.

Type in the U. S. National Herbarium, Nos. 1903260 and 1903261, collected in very sterile soil, at Chuare, Department of El Cauca, Colombia, altitude about 70 meters, December 24, 1946, by O. Haught (No. 5389).

Pitcairnia haughtii belongs to the section *Schweideleria* and would fall next to *P. alborubra* Baker in the Pflanzenreich key were the latter species correctly placed. Since *P. alborubra* does not belong in that section, *P. haughtii* can be said to differ from the remaining species of section *Schweideleria* in the Pflanzenreich by its linear-lanceolate entire leaf-blades. Probably it is nearer to *P. lepidopetalon* L. B. Smith than to any species in the Pflanzenreich, but differs from that species in its broader leaves and acute sepals.

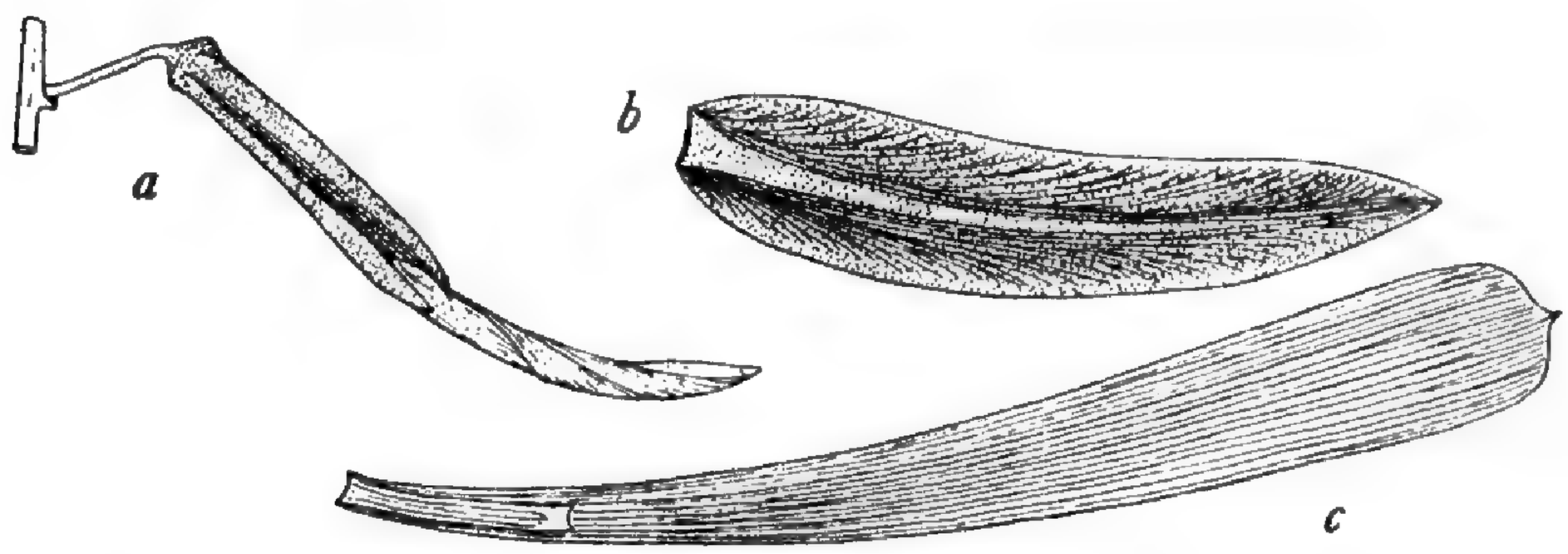

FIGURE 28.—*Pitcairnia haughtii: a*, Flower, × ½; *b*, sepal, × 1; *c*, petal, × 1.

Pitcairnia killipiana L. B. Smith, sp. nov. **FIGURE 29**

Foliis integris, supra vaginam paulo angustatis sed haud petiolatis, laminis linearibus; scapi bracteis internodia superantibus; inflorescentia laxissime paniculata; bracteis florigeris ellipticis, acutis, quam pedicellis brevioribus; sepalis oblongis, rotundatis apiculatisque; petalis basi ligula auctis.

Terrestrial, flowering plant 85 cm. high; stem horizontal, apparently subterranean; leaves fascicled, all alike, entire, nearly 9 dm. long, slightly narrowed above the narrowly elliptic sheath but hardly petiolate, the blades linear, long-acuminate, 3 cm. wide, glabrous; scape erect, slender, sparsely ferruginous-lepidote; scape-bracts erect, subfoliaceous, exceeding the internodes but covering little of the scape; inflorescence very laxly bipinnate, sparsely pale-lepidote; primary bracts quickly deciduous, unknown but probably small; racemes ascending, the sterile naked base 6 cm. long; floral bracts elliptic, acute, shorter than the pedicels; flowers divergent, subdistichous, red (! Killip); pedicels slender, 15–19 mm. long; sepals oblong, rounded and apiculate, 33 mm. long, nerved, glabrous; only the withered petals known, about 6 cm. long, bearing a large bidentate scale at base; ovary subglobose, almost wholly superior.

Type in the U. S. National Herbarium, No. 1771987, collected in dense forest, Corcovada Region, upper Río San Juan, ridge along Yeracüí Valley, Territory of El Chocó, Colombia, altitude 200–275 meters, August 24, 25, 1939, by E. P. Killip (No. 35245). Duplicate at G.

This species comes out with the Brazilian *Pitcairnia anthericoides* Mez in the Pflanzenreich but differs in its acute floral bracts and oblong sepals. Although its leaves are entire it is probably more nearly related to such Colombian species as *P. poortmani* André and *P. commixta* L. B. Smith.

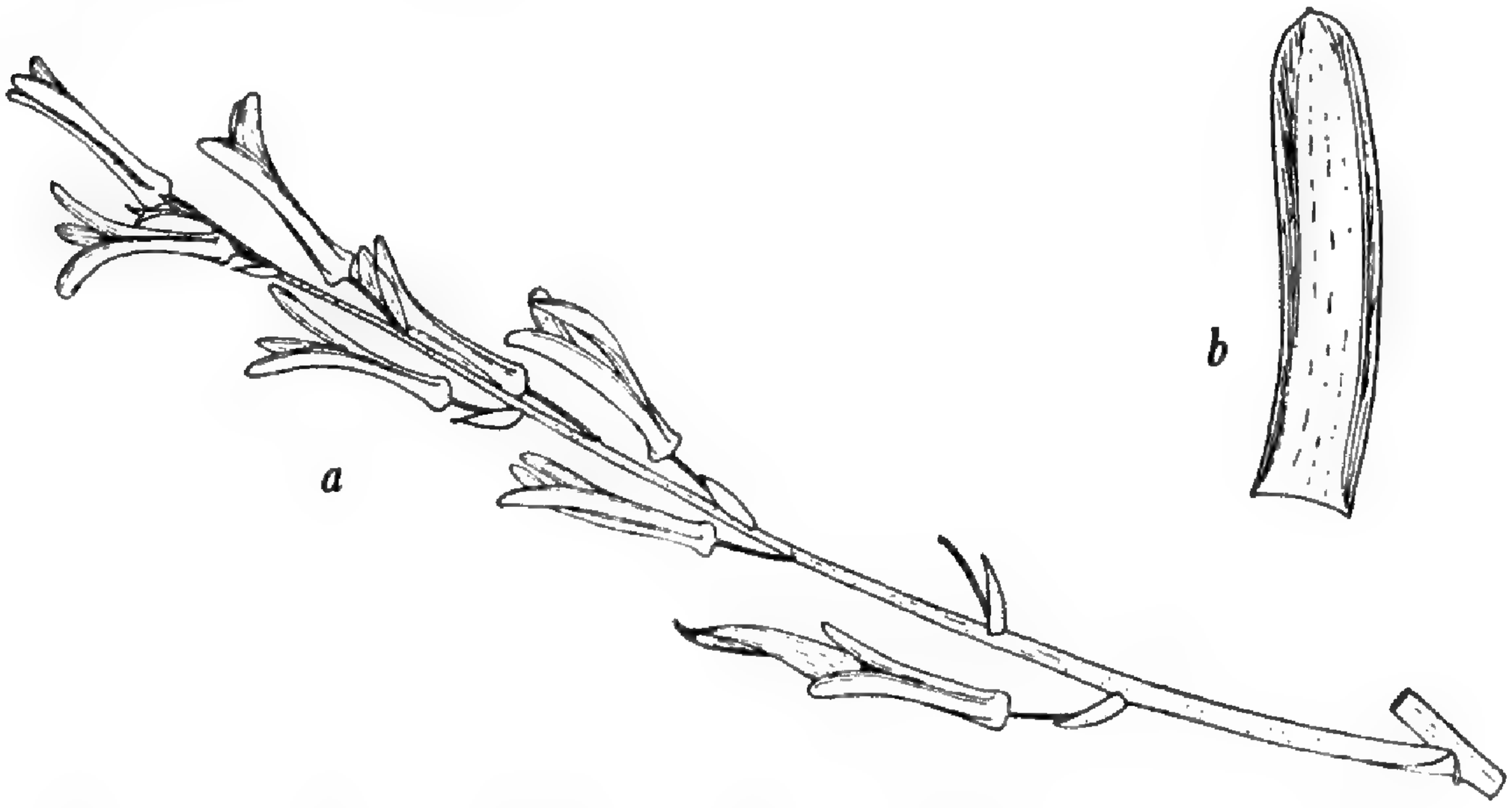

FIGURE 29.—*Pitcairnia killipiana: a*, Branch of inflorescence, × ½; *b*, sepal, × 1.

Pitcairnia lignosa L. B. Smith, sp. nov. FIGURE 30

Caule elongato, ramoso, lignoso; foliis homomorphis, laminis linearibus, deciduis; scapo erecto; scapi bracteis internodia superantibus; inflorescentia simplicissima, basi laxa; bracteis florigeris infimis sepala fere aequantibus; sepalis anguste triangularibus; petalis verisimiliter nudis; ovulis caudatis.

Terrestrial, long-caulescent, the flowering shoot about 5 dm. high; stem branched, woody, covered with the remains of old leaf-sheaths; leaves all alike, 3–4 dm. long, the sheaths suborbicular, 2 cm. in diameter, dark castaneous, white-flocculose, the blades linear, long-acuminate, about 10 mm. wide, glabrous above, densely white-lepidote beneath, deciduous along a straight transverse line 4 cm. above the sheath, subdensely serrate below the line with brown teeth 2 mm. long, the remnant spirally incurved, entire above the line; scape erect, 8 mm. in diameter densely white-flocculose; scape-bracts long-acuminate from an ovate base, much exceeding the internodes but covering little of the scape, white-lepidote; only withered inflorescences known, apparently white-flocculose, simple, 15–19 cm. long, lax at base, rather dense toward apex; floral bracts like the scape-bracts, the lowest much exceeding the pedicels and nearly equaling the sepals; flowers divergent; pedicels slender, 16 mm. long; sepals narrowly triangular, acuminate, 17 mm. long, carinate; petals about 5 cm. long, apparently naked; ovary three-fourths superior; ovules caudate.

Type in the Gray Herbarium, collected on the road between Tangüa and Tuquerres, Department of Nariño, Colombia, altitude 3,000 meters, November 18, 1946, by M. B. and R. Foster (No. 2200).

This new species seems more nearly related to *Pitcairnia tolimensis* L. B. Smith than to any species in the Pflanzenreich, but unlike that species it has slender pedicels and narrow floral bracts.

The following specimen, although larger and more robust than the type, appears to be conspecific:

COLOMBIA:

EL CAUCA: On dry rocks and banks, near Mercaderes on the road to Pasto, alt. 1167 m., Oct. 25, 1946, *M. B. & R. Foster* 1928 (G).

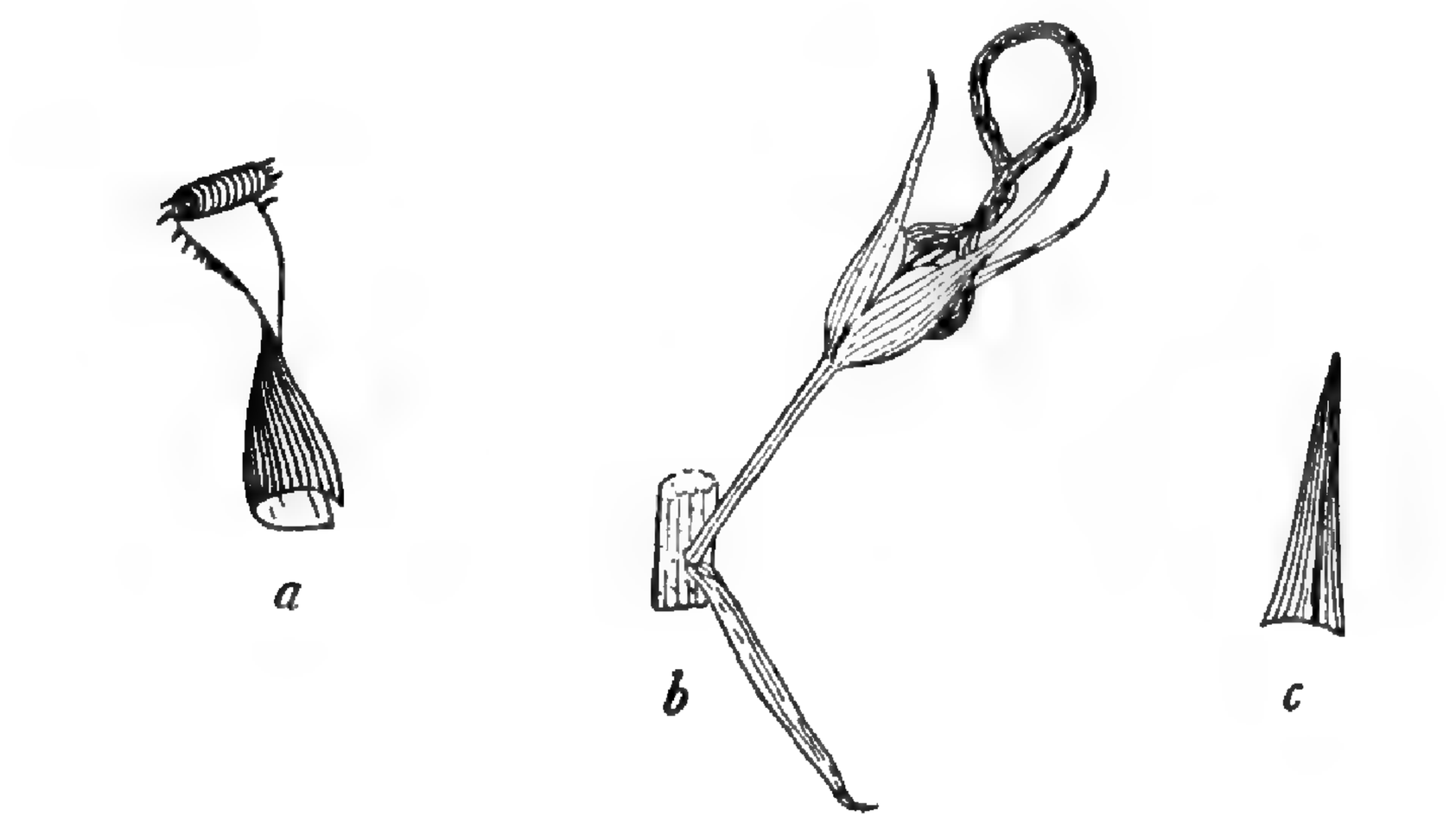

FIGURE 30.—*Pitcairnia lignosa: a*, Base of leaf, × ½; *b*, flower and bract, × 1; *c*, sepal, × 1.

Pitcairnia macranthera André, Énum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. **60:** 565. Dec. 16, 1888; Bromel. Andr. 29, *pl. 9, fig. F*. 1889.

Emended description: Stem erect, scandent, bearing widely separated fascicles of leaves, elsewhere covered with large triangular-oblong mucronate dark-castaneous buff-lepidote sheaths; leaves 5–6 dm. long, petiolate, the sheaths small, broadly ovate, the petioles short, rather densely serrate with dark spines 2 mm. long, buff-lepidote, the blades narrowly oblanceolate, acuminate, cuneate, 4–5 cm. wide, entire, glabrous, reticulate beneath; scape erect, 8 dm. long; scape-bracts large, imbricate and tightly sheathing the scape, the lowest like those of the stem, the upper lanceolate, acuminate, green; inflorescence simple, cylindric, 16 cm. long, 3.5 cm. in diameter, the axis sparsely buff-lepidote; floral bracts erect, densely imbricate, broadly ovate, acute, 48 mm. long, even, glabrous, green; flowers 4-ranked; pedicels short but slender; sepals linear-lanceolate, acuminate, uncinate, 6 cm. long, much exceeding the bracts, glabrous; petals linear, acute, 12 cm. long, about equaling the stamens, arcuate-recurved, white, bearing a serrate ligule at base; anthers 2 cm. long; ovary four-fifths superior; ovules caudate.

Type in the herbarium of the Royal Botanic Gardens, Kew, collected on sandstone rocks, near El Espino, Department of Nariño, Colombia, May 1876, by E. André (No. 2593).

The type of this species is extremely fragmentary, but so far as it is known it is very close in all characters to the following ample material:

COLOMBIA:

NARIÑO: Climbing in dense shrubbery, Altaquer, Río Cuaciquiere, alt. 900 m., Nov. 12, 1946, *M. B. & R. Foster* 2145 (G).

Pitcairnia maritima L. B. Smith, sp. nov. FIGURE 31

Foliorum petiolis serratis, laminis lineari-lanceolatis, integris; scapi bracteis imbricatis, lanceolatis, tenuibus, verisimiliter integris; inflorescentia simplicissima, dense brunneo-lanosa; bracteis florigeris imbricatis, sepalis paulo superatis, laevibus; floribus tristiche ordinatis, brevissime crasseque pedicellatis; sepalis acutis, valde asymmetricis; petalis ligula auctis.

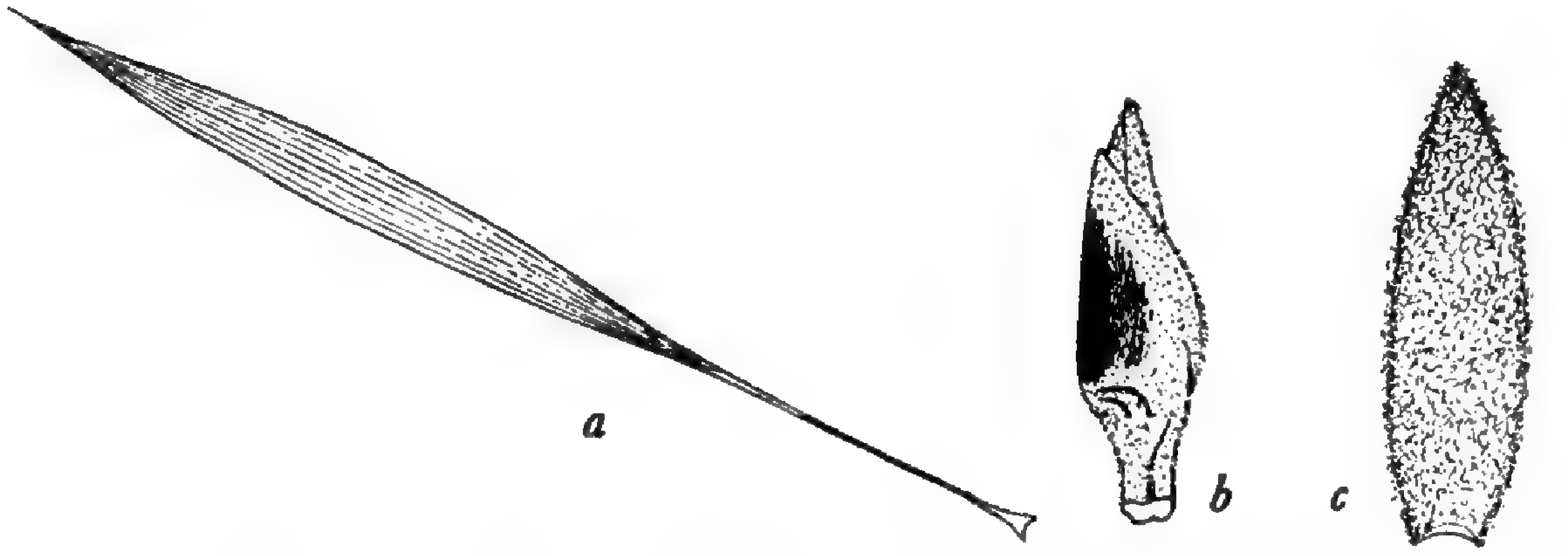

FIGURE 31.—*Pitcairnia maritima: a*, Leaf, × 1/20; *b*, flower and bract, × ½; *c*, sepal, × 1.

Flowering plant 1.8 meters high (! Foster); leaves few, 1.8 meters long, long-petiolate, the sheaths small, broadly reniform, dark ferrugineous-lanate, petioles serrate with dark spines 2 mm. long, the blades linear-lanceolate, acuminate, cuneate, entire, 9 cm. wide, brown-lanate but soon glabrous; scape straight, nearly 1 meter long, 1 cm. in diameter, densely lanate; scape-bracts erect, very densely imbricate, large, lanceolate, thin, known only from old and imperfect material but apparently entire; inflorescence simple, densely cylindric, over 7 dm. long, 4 cm. in diameter, brown-lanate; floral bracts erect, imbricate, broadly ovate, acute, 4 cm. long, slightly exceeded by the sepals, even, dark brown, thin-coriaceous; flowers 3-ranked; pedicels short and stout; sepals lanceolate, acute, strongly asymmetric, 37 mm. long, brown; petals recurving after anthesis (! Foster), strap-shaped, broadly rounded, 55 mm. long, yellow (! Foster), densely and minutely brown-lepidote outside, bearing a cupuliform scale at base; ovary three-fifths superior; ovules unknown.

Type in Gray Herbarium, collected on rocks near sea level, Buenaventura, Department of El Valle, Colombia, December 8, 1946, by M. B. and R. Foster (No. 2319).

Pitcairnia maritima appears to be related to *P. bakeri* André but has the flowers in very few ranks, even floral bracts, and a cup-shaped scale on the petal.

Pitcairnia multiflora L. B. Smith, sp. nov. FIGURE 32

Foliis dimorphis, alteris ad vaginas acutas reductis, alteris longe petiolatis, laminis late oblanceolatis; scapo erecto; scapi bracteis internodia superantibus; inflorescentia simplicissima, permultiflora; bracteis florigeris valde reflexis; pedicellis gracillimis; sepalis acuminatis; petalis quam sepalis haud longioribus, albis, nudis; ovulis caudatis.

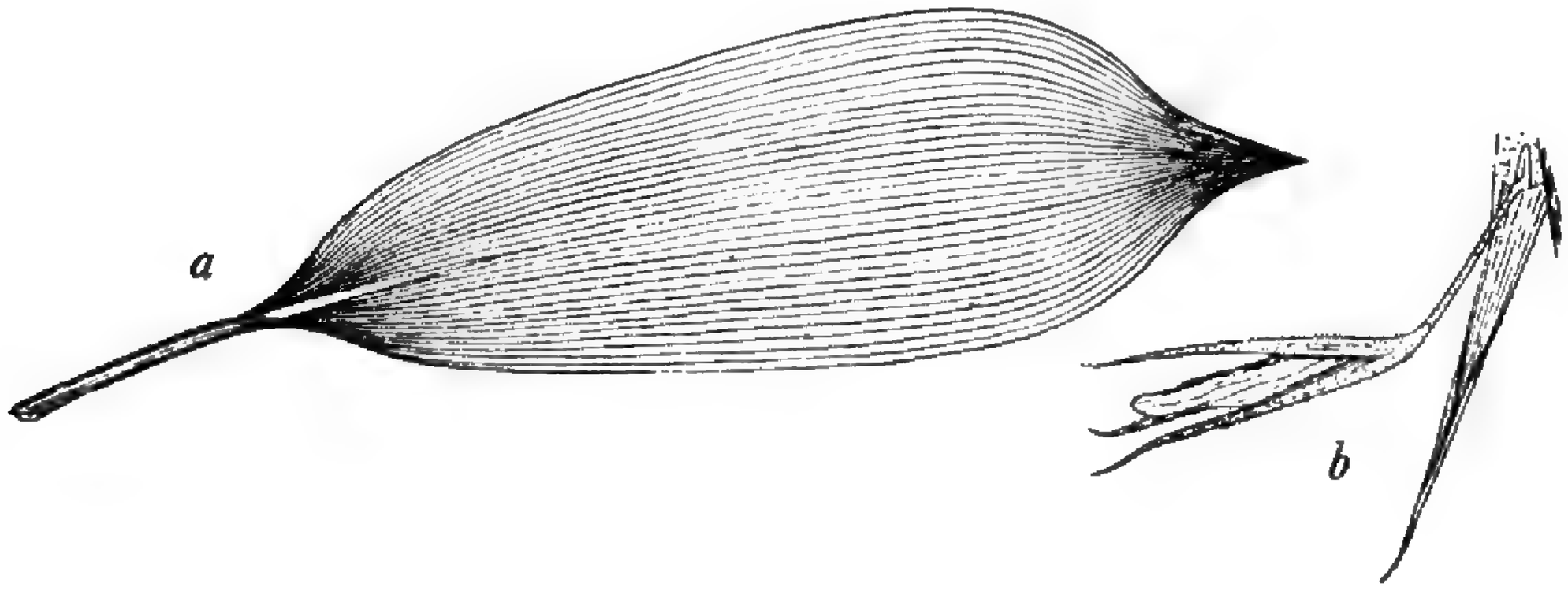

FIGURE 32.—*Pitcairnia multiflora: a*, Leaf-blade, × ⅙; *b*, flower and bract, × 1.

Terrestrial, flowering plant over 1 meter high (! Haught); leaves few (! Haught), apparently rosulate, entire, dimorphic, some reduced to elliptic acute pale-appressed-lepidote sheaths, others long-petiolate, the blades broadly oblanceolate, acute, 42 cm. long, 14 cm. wide, glabrous, reticulate beneath; scape erect, slender, pale-flocculose; scape-bracts erect, much exceeding the internodes, narrowly lanceolate, acuminate, entire, thin, red, flocculose at base; inflorescence simple, cylindric, 55 cm. long, 7 cm. in diameter, many-flowered, minutely pale-flocculose, the axis straight, sulcate; floral bracts sharply reflexed, nearly covering the axis, narrowly lanceolate, acuminate, membranaceous, red, the lowest longer than the pedicels, the upper only about half as long; pedicels very slender, 16 mm. long, the lower ones subreflexed, the upper spreading or slightly ascending; sepals linear-lanceolate, acuminate, 20 mm. long, ecarinate, green (! Haught); petals narrowly elliptic, acute, barely exceeding the sepals, white, naked; stamens included; ovary almost wholly superior; ovules long-caudate.

Type in the U. S. National Herbarium Nos. 1903257 and 1903258, collected at Kilometer 95 on the Cali-Buenaventura Highway, Department of El Valle,

Colombia, altitude 450 meters (but common to at least 1,500 meters according to Haught), December 11, 1946, by O. Haught (No. 5348).

In the Pflanzenreich this species would stand next to *Pitcairnia reflexiflora* André, but it differs from that species in its very wide oblanceolate leaves, long pedicels, and short white petals.

Pitcairnia quesnelioides L. B. Smith, sp. nov. FIGURE 33

Foliis subpetiolatis, laminis lineari-lanceolatis; scapo decurvato et dein prostrato; scapi bracteis infimis foliaceis; inflorescentia simplicissima, strobiliformi; bracteis florigeris deciduis, ignotis; floribus subsessilibus; sepalis late acutis; petalis basi ligula auctis; ovario patente dein abrupte sursum curvato, ¾ infero, indehiscente, alato; ovulis alatis.

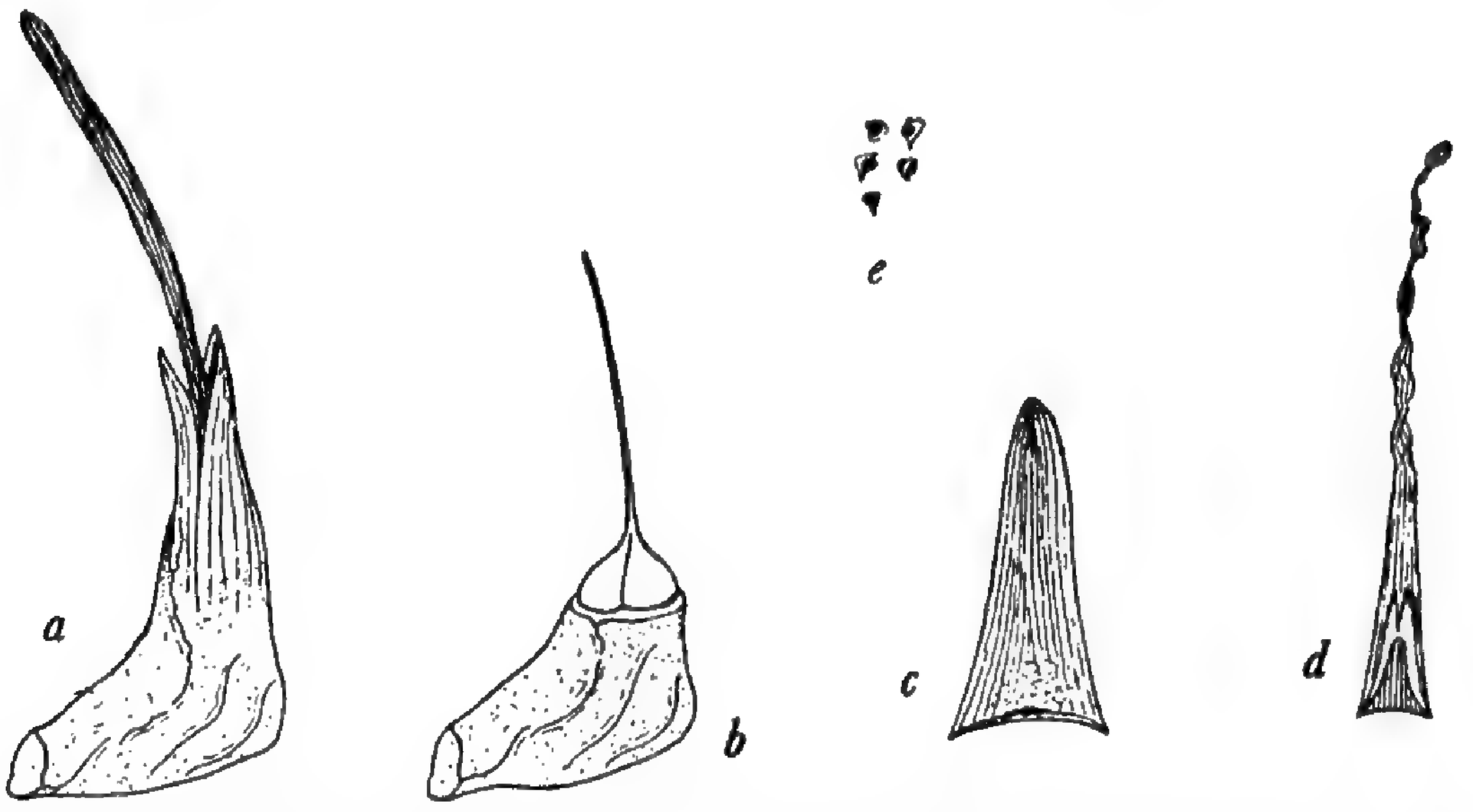

FIGURE 33.—*Pitcairnia quesnelioides: a*, Flower, × 1; *b*, ovary, × 1; *c*, sepal, × 1; *d*, petal, × 1; *e*, seeds, × 1.

Plants growing in dense masses; leaves over 1.5 meters long, subpetiolate, laxly serrulate at base, densely brown-flocculose beneath, soon glabrous above, the blades linear-lanceolate, acuminate, 4 cm. wide; scape erect for 15–20 cm. then decurved and prostrate; lower scape-bracts foliaceous, the upper deciduous and not known but probably imbricate; inflorescence simple, strobilate, cylindric, 15 cm. long, 5 cm. in diameter; floral bracts deciduous, unknown; flowers subsessile; sepals triangular-lanceolate, broadly acute, 24 mm. long, strongly nerved, glabrous in age, the posterior ones strongly carinate; only old petals known, 5 cm. long, bearing a large lacerate scale at base; ovary spreading then abruptly ascending, three-fourths inferior, indehiscent, winged, brown-flocculose at base; ovules winged.

Type in the Gray Herbarium, collected at Puerto Limón, Territory of Putumayo. Colombia, altitude 900 meters, November 24, 1946, by M. B. and R. Foster (No. 2257).

The strobilate prostrate inflorescence of *Pitcairnia quesnelioides* is quite unlike that of any species in the subgenus *Melinonia*, in which its largely inferior indehiscent ovary places it.

Pitcairnia tumulicola L. B. Smith, sp. nov. FIGURE 34

Foliis homomorphis, petiolatis, laminis lanceolatis, acuminatis, 7 cm. latis; scapo erecto; scapi bracteis quam internodia multo brevioribus; inflorescentia simplicissima, laxa; bracteis florigeris quam pedicellis brevioribus; pedicellis gracillimis, ad 4 cm. longis; sepalis anguste oblongis, obtusis; petalis viridibus, basi ligula auctis; ovulis caudatis.

Flowering plant 1.3 meters high; leaves few, all alike, slightly shorter than the inflorescence, entire, distinctly petiolate, the sheaths small, broadly ovate, dark castaneous, densely ferrugineous-lepidote, becoming glabrous, the petioles elongate, red (! Foster), the blades lanceolate, acuminate, 7 cm. wide, dark green above (! Foster) and glabrous, beneath reddish (! Foster) and densely white-lepidote; scape erect, slender, white-flocculose; scape-bracts erect, lanceolate, acuminate, much shorter than the internodes, densely white-flocculose; inflorescence simple, lax, 14 cm. long, densely white-flocculose; floral bracts lanceolate, acute; about a third as long as the pedicels; pedicels very slender, ascending, to 4 cm. long; sepals narrowly oblong, obtuse, 30 mm. long; strongly nerved, carinate, crested at base; petals 45 mm. long, acute, green, bearing a large scale at base; stamens included; ovary two-thirds superior; ovules caudate.

Type in the Gray Herbarium, collected on mounds of roots and mosses, at Altaquer, Department of Nariño, Colombia, altitude, 1,050 meters, November 10, 1946, by M. B. and R. Foster (No. 2071).

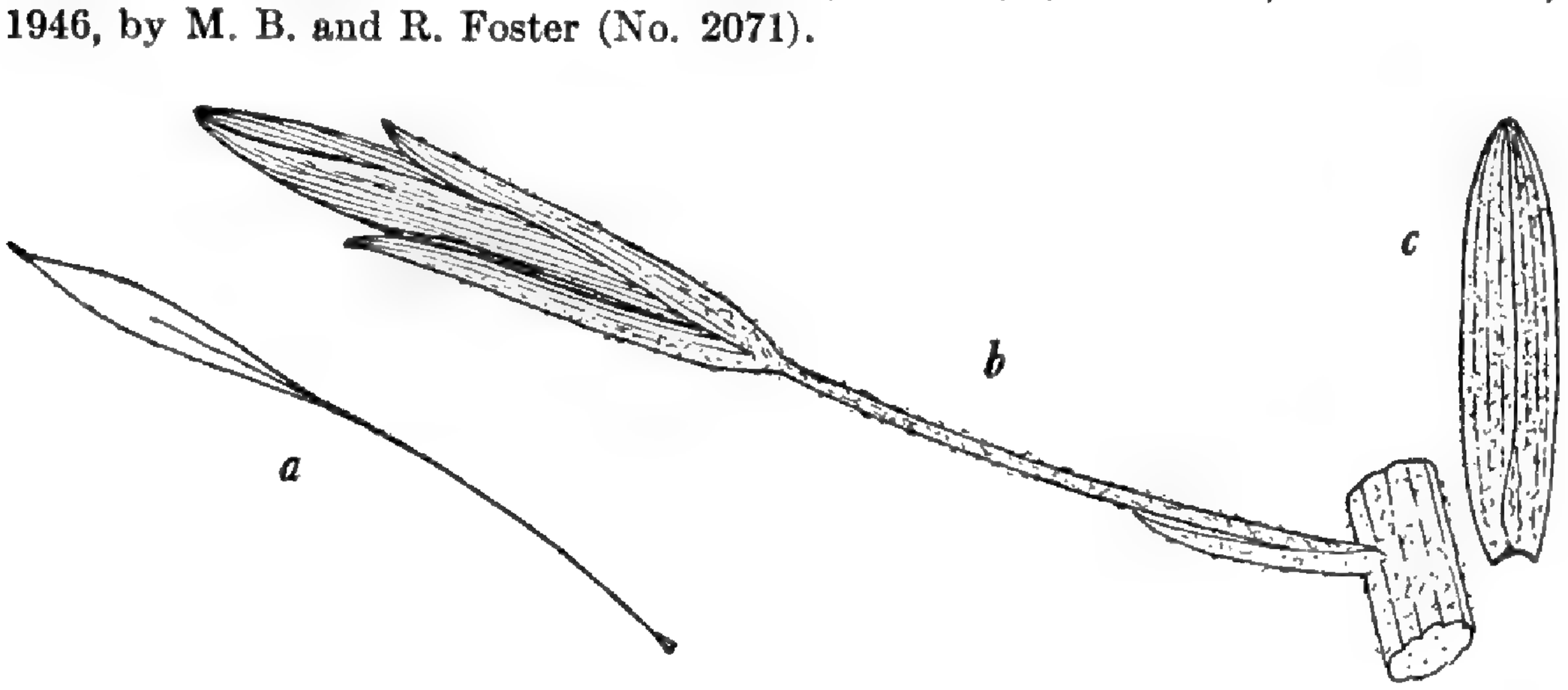

FIGURE 34.—*Pitcairnia tumulicola: a*, Leaf, × 1/20; *b*, flower and bract, × 1; *c*, sepal × 1.

Its dense indument would place *Pitcairnia tumulicola* next to *P. pavonii* Mez in the Pflanzenreich key, but its very long pedicels and short floral bracts make it appear more like *P. longipes* Mez. Its

leaf-blades are more than twice as wide as those of either of the other species and its petals are green.

ECUADOR

Puya hamata L. B. Smith, sp. nov. FIGURE 35

Foliorum spinis ad 15 mm. longis; inflorescentia cylindrica, densisime bipinnatim paniculata, dense albo-lanata; bracteis primariis ramos superantibus, integris; racemis subglobosis; bracteis florigeris integris, sepala subaequantibus; sepalis late ellipticis, ad 23 mm. longis.

Flowering plant 3–4 meters high (! Hitchcock); leaves 9–15 dm. long (! Hitchcock), the sheaths ample, minutely serrate toward apex, the blades linear, acuminate, pungent, 3 cm. wide, flat, glabrous above, beneath minutely pale-lepidote between the nerves, laxly serrate with broad dark hooked teeth 15 mm. long; scape erect, 1 dm. in diameter; inflorescence cylindric, very densely bipinnate, 2 dm. or more in diameter, densely white-lanate; primary bracts acuminate from an ovate base, exceeding the axillary branches at anthesis, entire; racemes subglobose, subsessile; floral bracts elliptic, acute, entire, about equaling the sepals, chartaceous when dry; pedicels stout, about 1 cm. long; sepals broadly elliptic, slightly asymmetric, to 23 mm. long, ecarinate, coriaceous; petals obtuse, 4 cm. long, dark blue.

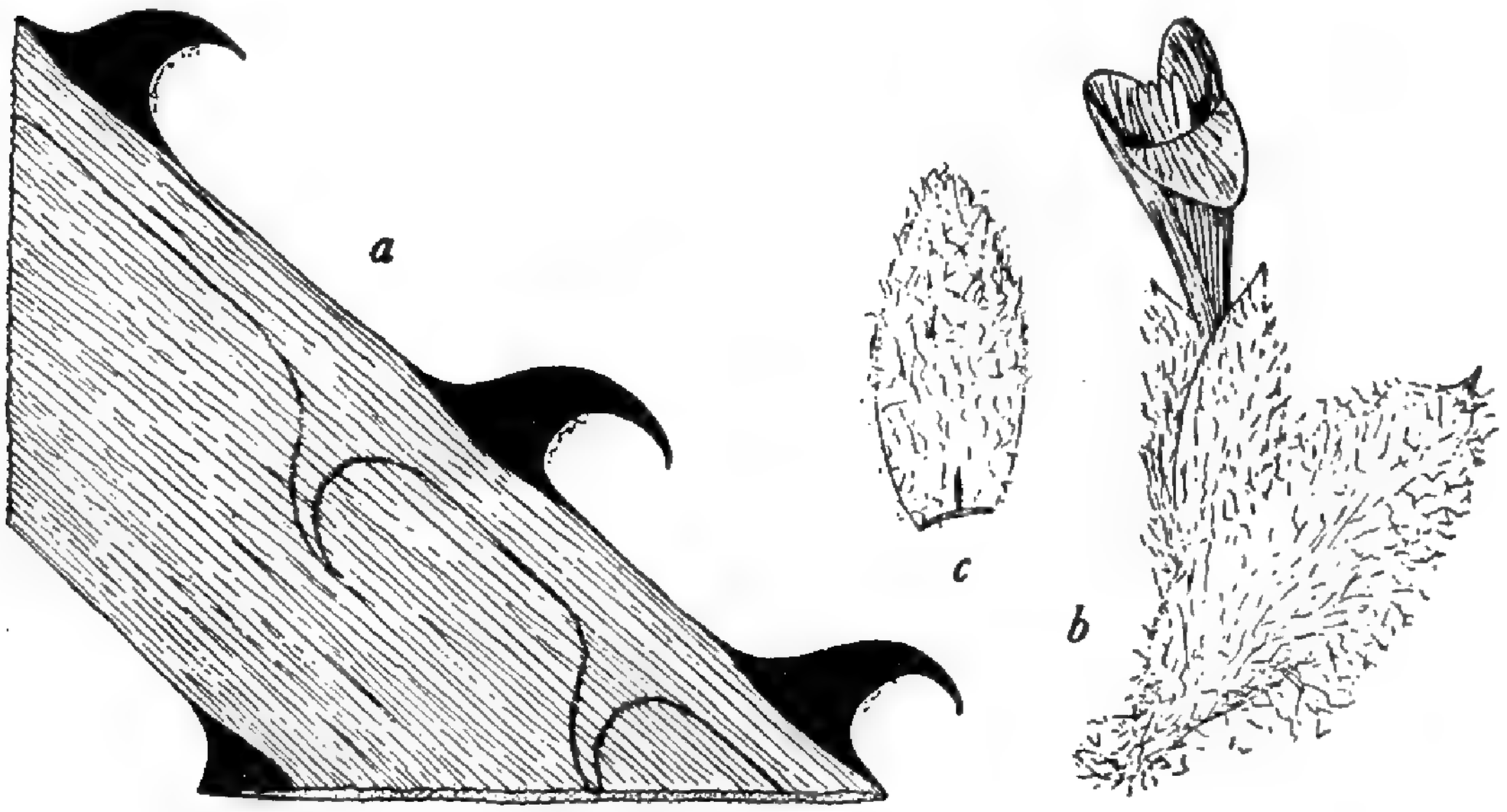

FIGURE 35.—*Puya hamata: a*, Section of leaf-blade, × 1; *b*, flower and bract, × 1; *c*, sepal, × 1.

Type in the U. S. National Herbarium, No. 1196106, collected on páramos 12 miles west of Tulcán, Province of Carchi, Ecuador, altitude, 3,300 meters, August 10, 1923, by A. S. Hitchcock (No. 20915).

Additional specimen examined:

ECUADOR:

CARCHI: Margins of páramo and páramo along road from Tulcán to El Pun, alt. 3,150–3,420 m., Aug. 18, 1944, *Wiggins* 10645 (G).

In the key to *Puya* in the Pflanzenreich, *P. hamata* would fall in the vicinity of *P. mollis* Baker, but it differs in its relatively large floral bracts, denser spikes and indument, and most obviously of all in its tremendous leaf-spines.

Puya parviflora L. B. Smith, sp. nov. FIGURE 36

Laminis foliorum supra dense albo-lepidotis, subtus apice excepto mox glabris; inflorescentia metralis (! Espinosa), ramosa; axibus albo-flocculosis; racemis substrobiliformibus, breviter stipitatis, bracteas primarias bene superantibus; bracteis florigeris late ovatis,breviter acuminatis, sepala subaequantibus; floribus breviter pedicellatis; sepalis lanceolatis, carinatis, 16 mm. longis.

Known only from fragments; leaf-blades linear, acuminate, 20–26 cm. long, 15 mm. wide, densely appressed-pale-lepidote above, soon glabrous beneath except near apex; scape unknown; inflorescence 1 m. long (! Espinosa), laxly bipinnate but subdense toward apex;

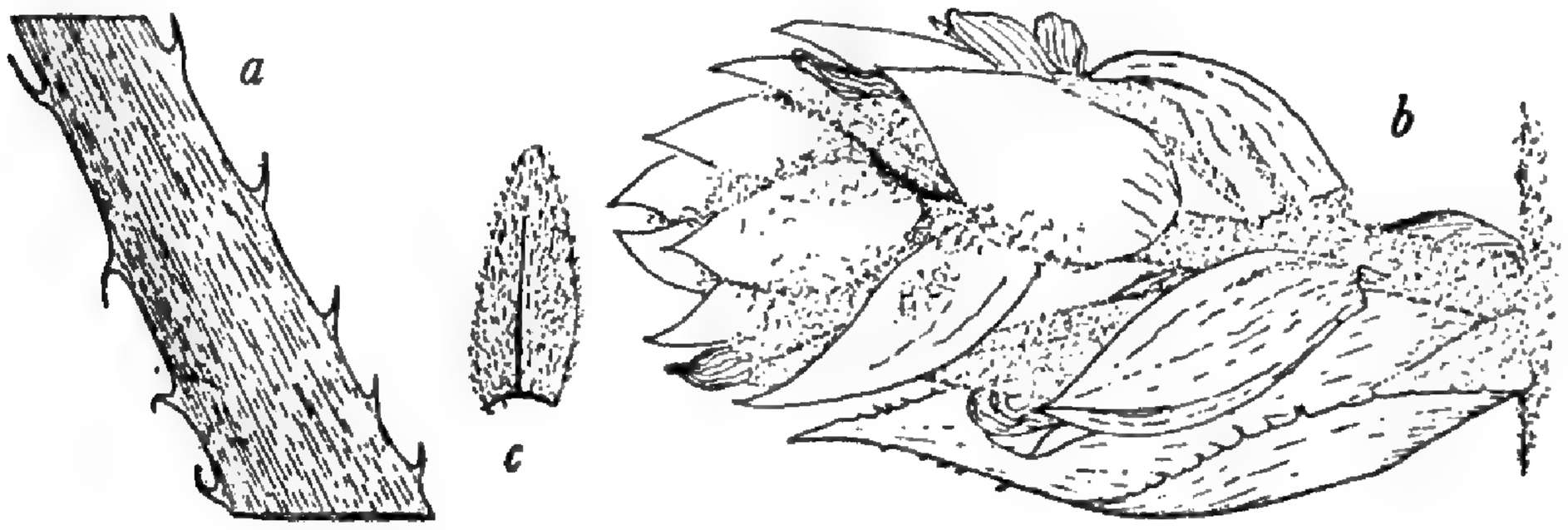

FIGURE 36.—*Puya parviflora: a*, Section of leaf-blade, × 1; *b*, branch of inflorescence, × 1; *c*, sepal, × 1.

axes densely white-flocculose; primary bracts broadly ovate, acuminate, distinctly shorter than the spikes, serrate, thin-coriaceous, sublustrous, soon glabrous beneath except near apex; racemes spreading, substrobilate, 6–7 cm. long, 3 cm. in diameter, about 15-flowered, the naked sterile base 1 cm. long; floral bracts broadly ovate, short-acuminate, 22 mm. long, about equaling the sepals, erose-denticulate, sublustrous; flowers suberect; pedicels short and stout; sepals lanceolate, 16 mm. long, carinate, densely white-flocculose; petals 25 mm. long, green.

Type in the U. S. National Herbarium, No. 1950602, collected at Hacienda Ambocas, northeast of Zaruma, Tío Loma, Province of El Oro, Ecuador, altitude 2,200–2,900 meters, August 30, 1947, by R. Espinosa (No. E2052).

In Mez's monograph in the Pflanzenreich, *Puya parviflora* would fall next to *P. stipitata* L. B. Smith, from which it differs in many characters, most strikingly in its white-flocculose indument and relatively large sublustrous floral bracts.

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SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 29, PART 8

STUDIES OF SOUTH AMERICAN PLANTS, XII

By A. C. SMITH

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BULLETIN OF THE UNITED STATES NATIONAL MUSEUM

PREFACE

THE present number of the Contributions, by A. C. Smith, curator of the division of phanerogams, United States National Herbarium, is a continuation of his series of studies of South American plants, of which it is the twelfth. In it are described 45 new species of the families Myristicaceae, Hippocrateaceae, Ericaceae, and Vacciniaceae, these being groups that have already been partially monographed or revised by the author. Recent collecting in northern South America continues to disclose new or noteworthy plants in these families, as in others; in the present treatment various range extensions are noted, and the synonymies of certain plants are adjusted.

E. P. KILLIP,
Head Curator, Department of Botany,
United States National Museum.

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STUDIES OF SOUTH AMERICAN PLANTS, XII

By A. C. SMITH

INTRODUCTION

THE present paper, like preceding studies in this series,[1] is intended to bring together miscellaneous notes on South American representatives of special families of phanerogams. The families discussed in this treatment are the Myristicaceae, Hippocrateaceae, Ericaceae, and Vacciniaceae. Recently collected South American specimens of these families that have come to the writer's attention include numerous plants of unusual interest; particular mention should be made of the excellent collections of Dr. J. Cuatrecasas in Colombia and Dr. J. A. Steyermark in Ecuador (Dr. Steyermark's Venezuelan material of these families will be discussed as a part of his report, now in press). As a result of the field work of these and other collectors, I find it desirable to describe 45 species as new and to propose 4 new combinations and 3 new names in the mentioned families. Other notes pertain to range-extensions, rare or particularly noteworthy species, or adjustments in synonymy.

Specimens cited in this study are deposited at the following institutions: Arnold Arboretum of Harvard University (A); Chicago Natural History Museum (Ch); New York Botanical Garden (NY); U. S. National Herbarium (US). I am grateful to the directors and curators of these institutions for their kindness in making material available for study.

[1] Previous papers in this series have been published as follows:

I. Bull. Torrey Club 58: 87–110. 1931.
II. Op. cit. 59: 513–524. 1932.
III. Op. cit. 60: 99–121. 1933.
IV. Phytologia 1: 126–132. 1935.
V. Bull. Torrey Club 63: 307–316. 1936.
VI. Op. cit. 66: 231–249. 1939.
VII. Trop. Woods 58: 25–32. 1939.
VIII. Amer. Journ. Bot. 26: 407–412. 1939.
IX. Op. cit. 27: 541–547. 1940.
X. Journ. Arn. Arb. 24: 460–471. 1943.
XI. Op. cit. 27: 86–120. 1946.

MYRISTICACEAE

Since my revision of this family in 1937 and the few supplementary notes I have since published,[2] numerous species have been found to occur beyond the limits of the ranges ascribed to them. Up to the present, 12 species of Myristicaceae have been known from Colombia, and of these only one was known with certainty to occur on the Pacific coastal strip. Largely as a result of recent collections by Dr. Cuatrecasas, I am able to record 8 additional species from Colombia, while 12 species are now known to occur on the Pacific coast (4 of these being new and described in this treatment). In addition to these Colombian records, the present notes deal with interesting records in Venezuela and elsewhere, based on recently available collections.

Compsoneura cuatrecasasii A. C. Sm. sp. nov.

Arbor grandis *C. racemosae* Ducke, *C. sprucei* (A. DC.) Warb., et *C. capitellatae* (A. DC.) Warb. affinis, foliorum laminis apice obtusis vel obtuse cuspidatis, nervis tertiariis immersis, inflorescentia mascula copiose strigosa, perianthio plerumque 4-lobato, antheris 4 brevibus cum connectivis carnosis acutis quam thecis longioribus valde differt.

Large tree, 20 m. high or more, the branchlets slender, terete, brownish, at first densely strigose (hairs pale-ferruginous, predominantly 2-branched, about 0.2 mm. in total length), glabrescent; petioles slender, deeply canaliculate, 8–15 mm. long, strigose like the branchlets, glabrescent; leaf-blades subcoriaceous, pale brown when dried, elliptic- or obovate-oblong, 8–13.5 cm. long, 3.5–7 cm. broad, rounded or broadly obtuse at base, obtuse or obtusely cuspidate at apex, narrowly recurved at margin, glabrous on both surfaces or with inconspicuous scattered hairs beneath like those of branchlets, the costa slightly raised above, prominent beneath, the secondary nerves 6–9 per side, arcuate-ascending, slightly impressed above, sharply raised beneath, the tertiary nerves immersed, sometimes faintly impressed above and scarcely prominulous beneath; staminate inflorescences solitary or paired, usually axillary, simple or essentially so, copiously strigose on all exterior surfaces (hairs predominantly 2-branched, 0.1–0.3 mm. in total length), fasciculate-racemose, 1.5–2.5 cm. long at anthesis, the rachis slender, subterete, the peduncle short, the fascicles alternate, 3 or 4 per inflorescence, sessile or very short-stalked, subtended by subcoriaceous oblong-orbicular bracts 1.5–2 mm. long and broad; flowers usually 3–5 per fascicle, the pedicels slender, 4–5 mm. long at anthesis; perianth carnose, essentially glabrescent at anthesis, 2.5–3 mm. long, predominantly 4-lobed (sometimes 5-lobed) for slightly more than half its length, the lobes deltoid-lanceolate, acute; androecium about

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[2] Brittonia 2: 393–510. 1937; 3: 339–340. 1939; Journ. Arn. Arb. 24: 460–461. 1943.

1.5 mm. long, the filament-column stout, terete, slightly swollen at base, the anthers 4 (as far as observed), 0.5–0.6 mm. long, free, erect, consisting of carnose acute pellucid-glandular connectives slightly exceeding the dorsally adnate anthers, the thecae 0.3–0.4 mm. long; pistillate and complete fruiting inflorescences not known; mature fruits pedicellate (pedicels about 4 mm. in diameter, the complete ones not seen), oblong-ovoid, up to 8 cm. long and 4 cm. in diameter, rounded to cuneiform at base, obtusely cuspidate at apex, the pericarp brittle, 2–3 mm. thick, finely rugulose without, glabrous or with a few minute scattered 2-branched hairs (suggesting a strigose ovary), the aril apparently entire, thin and inconspicuous, adhering to inner wall of pericarp in dried fruits; seed similar to entire fruit in shape, only slightly smaller, the testa copiously reticulate-veined, the endosperm white, not ruminate.

Type in the herbarium of the Arnold Arboretum, collected at Guayabal, Río Micay, Pacific coast, Department of Cauca, Colombia, alt. 5–20 meters, February 25, 1943, by J. Cuatrecasas (No. 14139). Duplicate in the Chicago Natural History Museum.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: El Valle: Pacific coast, Río Cajambre, Silva, alt. 5–80 m., *Cuatrecasas* 17535 (A, Ch).

The species described above is superficially not suggestive of *Compsoneura*, as the tertiary nerves of its leaf-blades are immersed, but nevertheless these nerves are oriented in the manner typical for the genus. The essential floral characters are those of Warburg's subgenus *Eucompsoneura*, in which, however, the unusually heavy indument of the inflorescence, the predominantly 4-lobed perianth, the comparatively few anthers, the large fruits with apparently concolored seeds, and other obvious features of inflorescence and foliage readily distinguish it.

The type collection bears staminate inflorescences and No. 17535 is accompanied by detached fruits. The specimens are from large trees, at least 20 meters high and 25 cm. in diameter. The bark is rugose and scaly-fissured, dark ochraceous, and the trunk yields a somewhat sticky red sap. The outer wood is white and the heartwood castaneous. The leaves are dark green and shining above, and the staminate flowers are yellow. The fruits are brownish green, almost smooth, with slender longitudinal veinlets (these not apparent when dried). The seed has a white endosperm with the consistency and taste of the chestnut.

Compsoneura trianae Warb. Nova Acta Acad. Leop.-Carol. 68: 147. 1897.

COLOMBIA: El Valle: Chocó region, Río Calima, La Trojita, alt. 5–50 m., *Cuatrecasas* 16590 (A, Ch). Pacific coast, Río Cajambre, Silva, alt. 5–80 m., *Cuatrecasas* 17434 (A, Ch). Río Cajambre, Barco, alt. 5–80 m., *Cuatreacasas* 16980 (A, Ch).

The three cited collections are of particular interest because the species has previously been known only from Triana's type collection,[3] from Colombia without definite locality. The occurrence of the species at low elevations on the Pacific coast inclines one to believe that Triana may have obtained his specimen in that general region, or perhaps slightly to the south, where he is known to have worked. Although Cuatrecasas's specimens are all in fruit, and the diagnostic characters of the genus are in the staminate flowers, the agreement with the type in foliage is so exact that I have little doubt of the identification. My description of 1937 may be amplified as follows:

Fruiting inflorescence 3–8 cm. long, the mature fruits apparently 2–4 per inflorescence; rachis and pedicels stout, terete, rugulose, the pedicels 5–7 mm. long; fruits ovoid or ellipsoid, 3–4.5 cm. long, 2–2.8 cm. broad, abruptly stipitate at base (stipe 1–2 mm. long), obtuse at apex, the pericarp brittle, about 0.3 mm. thick, the aril inconspicuously laciniate at apex, the seed ellipsoid, up to 3 cm. long and 2 cm. broad, the testa conspicuously splotched.

Cuatrecasas's ample field notes indicate the plant as a large tree, 15 meters or more in height, with the trunk about 15 cm. in diameter, with white wood and the usual latex of the family. The fruits are greenish yellow and have a bright red or scarlet aril.

Dialyanthera parvifolia Markgraf, Notizbl. Bot. Gart. Berlin 9: 964. 1926.

Virola glycycarpa Ducke, Bol. Téch. Inst. Agron. Norte (Belém) 4: 9. 1945.

BRAZIL: Amazonas: Esperança, mouth of Rio Javary, *Ducke* 1508 (type coll. of *Virola glycycarpa*, US).

Careful examination of the above cited isotype and of Ducke's original description indicates that a species of *Dialyanthera* is represented. The specimen bears essentially mature fruits, which are said to be green and to have a very sweet, white aril. The hairs of the branchlets and leaves of this specimen are of the typical 2-armed type characteristic of *Dialyanthera*.[4] In all essential respects Ducke's collection is typical for *D. parvifolia*, although its leaf-blades are more copiously pilose beneath than usual; however, some of the leaves are nearly glabrous, and examination of an extensive series of specimens indicates that the species is very variable in this respect, the dense tomentum being characteristic of young leaves but in general evanescent.

Dialyanthera gracilipes A. C. Sm. sp. nov.

Arbor *D. acuminatae* Standl. et *D. otoba* (Humb. & Bonpl.) Warb. affinis; a priore foliorum laminis apice acutis vel breviter cuspidatis non acuminatis, inflorescentia mascula longiore sparse strigosa, fasci-

[3] Cf. Brittonia 2: 414. 1937.

[4] Cf. illustration in Brittonia 2: *fig. 3, e, h, k*, on p. 420. 1937.

culis numerosioribus paucifloris, antheris basifixis recedit; a posteriore foliis minoribus gracilius petiolatis cum nervis secundariis pauciori-bus, inflorescentia sparse strigosa pauciflora, pedicellis et floribus omnino brevioribus differt.

Large tree, the branches slender, rugulose, brownish, glabrous or when juvenile with a few scattered minute 2-branched hairs; petioles slender, canaliculate, 1–2 mm. broad including the narrow wings, 10–15 mm. long, essentially glabrous; leaf-blades narrowly elliptic or lanceolate-oblong, 7–10 cm. long, 2–4.5 cm. broad, acute to attenuate at base, acute or short-cuspidate at apex, papillose on both surfaces, bearing a few scattered 2-branched hairs beneath, the costa plane or slightly raised above, prominent beneath, the secondary nerves 6–8 per side, arcuate-spreading, faintly impressed above and slightly raised beneath; staminate inflorescences 1–3 in leaf-axils, simple, sparsely strigose on all exterior surfaces (hairs usually 2-branched, about 0.2 mm. in total length), 6–7 cm. long at anthesis, the peduncle 1–2 cm. long; fascicles alternate, 4–6 per inflorescence, the bracts minute, caducous, the flowers 2–4 per fascicle, the pedicels slender, 2–3 mm. long at anthesis; perianth about 3 mm. long, 3-lobed nearly to base, the lobes oblong, rounded or obtuse; androecium about 2 mm. long, the filament-column swollen at base, divided in the distal 0.5 mm., the anthers about 0.5 mm. long, attached at base; pistillate inflorescences solitary or paired, 2.5–4 cm. long, sparsely strigose like the staminate; fascicles 2 or 3 per inflorescence, the flowers usually 2 or 3 per fascicle, the pedicels about 4 mm. long at anthesis; perianth like the staminate but up to 4.5 mm. long at anthesis, the ovary ellipsoid, short-stipitate, glabrous, the stigma obviously cleft.

Type in the herbarium of the Arnold Arboretum, collected along Quebrada de Guapecito, Río Cajambre, Pacific coast, Department of El Valle, Colombia, alt. 0–5 meters, May 16, 1944, by J. Cuatrecasas (No. 17708). Duplicate in the Chicago Natural History Museum.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: El Valle: Pacific coast, Río Micay, Noanamito branch, right bank, El Chachajo, alt. 2–5 m., *Cuatrecasas* 14252 (A, Ch).

The cited specimens are from large trees; the perianth is said to be greenish white or pale greenish yellow. The type collection bears staminate inflorescences and No. 14252 pistillate. From its closest allies, *D. acuminata* Standl. and *D. otoba* (Humb. & Bonpl.) Warb., the new species is distingushed by the foliage and floral characters mentioned in the foregoing diagnosis.

Dialyanthera otoba (Humb. & Bonpl.) Warb. Bericht. Deutsch. Bot. Ges. 13: (89). 1895.

COLOMBIA: El Valle: Chocó region, Río Calima, La Trojita, alt. 5–50 m., *Cuatrecasas* 16293 (A, Ch), 16609 (A, Ch). Norte de Santander: Sarare region,

Quebrada de la China (branch of Río Cubugón), Santa Librada, alt. 820 m., *Cuatrecasas* 12977 (US).

The two specimens from El Valle are particularly interesting, as previously [5] I had listed Colombian specimens of *D. otoba* only from the Magdalena Valley. Both specimens from El Valle are in fruit. Another specimen from La Trojita, which I refer here with question, is *Cuatrecasas* 16245 (Ch), which has unusually small and clearly nerved leaves for the species, while the fruiting inflorescences are very robust.

Dialyanthera latialata Pittier, Contr. U. S. Nat. Herb. **20:** 454. 1922.

COLOMBIA: El Valle: Western slope of Western Cordillera, valley of Río Anchicayá, left side, woods between Pavas and Miramar, alt. 350–450 m., *Cuatrecasas* 14421 (A, Ch).

The cited collection appears to be the second of the species, otherwise known only from the type collection, from Colón, Panama; it agrees in all respects with the type, like which it bears staminate inflorescences. The small perianth and anthers of *D. latialata*, as well as its much sparser indument, permit its ready separation from *D. lehmannii* A. C. Sm., which on the basis of available material appears to be more abundant in Pacific Colombia.

Dialyanthera lehmannii A. C. Sm. Brittonia 2: 423. *fig. 8, g–i.* 1937.

COLOMBIA: El Valle: Chocó region, Río Calima, La Trojita, alt. 5–50 m., *Cuatrecasas* 16709 (A, Ch). Río Calima, right bank, slopes opposite Quebrada de la Brea, alt. 30–50 m., *Cuatrecasas* 21103 (A, Ch). Pacific coast, Buenaventura Bay, Quebrada de Aguadulce, alt. 0–10 m., *Cuatrecasas* 19979 (A, Ch). Western slope of Western Cordillera, valley of Río Anchicayá, between Sabaletas and Quebrada del Tátabro, alt. 30–60 m., *Cuatrecasas* 22051 (A, Ch); valley of Río Digua, left side, Piedra de Moler, alt. 900–1,180 m., *Cuatrecasas* 14958 (A, Ch); valley of Río Sanquininí, left side, La Laguna, alt. 1,250–1,400 m., *Cuatrecasas* 15455 (A, Ch). Western Cordillera, La Cumbre, among rocks, alt. 1,680 m., *Cuatrecasas* 19567 (A, Ch). Eastern slope of Western Cordillera, valley of Río Cali, Río Pichindé, between Los Cárpatos and El Olivo, alt. 2,025–2,920 m., *Cuatrecasas* 21746 (A, Ch).

The beautiful series of specimens cited above demonstrates that *D. lehmannii*, thus far known only from two Lehmann collections from low elevations near the coast of El Valle and Cauca, is actually not a rare species. Cuatrecasas's material demonstrates that its range covers a wide altitudinal belt, extending over the crest of the Western Cordillera to its eastern slopes at altitudes exceeding 2,000 meters.

The new material differs from my original description in one important feature: The filaments are sometimes separate distally and the anthers are always separate to the base, not dorsally connate. The original mention of the anthers as connate nearly to apex was possibly

[5] Brittonia 2: 421. 1937.

due to faulty observation on my part, or possibly to normal variation within the species; other species of the family show considerable variation in degree of fusion of anthers. Cuatrecasas's material permits amplification of the original description in several respects, and the following notes should be taken in connection with the earlier description:

A large tree, the trunk up to 60 cm. in diameter; petioles up to 55 mm. long and 18 mm. broad (including wings); leaf-blades up to 35 cm. long and 13 cm. broad, attenuate to obtuse at base, usually persistently tomentellous beneath but sometimes (e. g., No. 21103) subglabrescent; staminate inflorescences up to 12 cm. long, the fascicles sometimes as many as 8 per inflorescence, subtended by large ovate-deltoid bracts, these up to 10 mm. long and 6 mm. broad, tomentellous without, obtuse, caducous as soon as fascicles expand; flowers sometimes only 4 per fascicle but usually 10–20, the pedicel 4–8 mm. long at anthesis, the perianth 5–6.5 mm. long; androecium 3.5–4 mm. long, the filament column entire to apex or the filaments free in the distal 1 mm., the anthers 0.8–1.2 mm. long, attached dorsally at base, free but often curved with the apices contiguous; pistillate inflorescences 3–4 cm. long at anthesis, usually with 4 or 5 fascicles of flowers, the flowers usually 3–5 per fascicle; perianth as in staminate flowers, the ovary short-stipitate, ovoid, densely strigose, the style short, glabrous, the stigma cleft; fruiting inflorescences up to 12 cm. long, the rachis at length glabrescent, the mature fruits probably not more than 5 per inflorescence, pedicellate (pedicels 15–25 mm. long, stout, rugulose, glabrescent, swollen distally), ovoid, inconspiciously carinate, 50–60 mm. long, 40–45 mm. broad, stipitate at base (stipe 3–5 mm. long), cuspidate at apex, the pericarp 3–5 mm. thick, glabrescent, very strongly rugose when dried, the aril laciniate nearly to base, the seed ovoid, 30–35 mm. long, 22–27 mm. broad, obtusely cuspidate at apex.

Ample color notes accompanying the new collections indicate that the tomentum is ferruginous, the perianth yellow or pale green within, the fruit with a brownish green to pale greenish yellow pericarp, the aril semitransparent and white or cream-colored to pink, the seed pale brown or castaneous, and the endosperm white.

Iryanthera tessmannii Markgraf, Notizbl. Bot. Gart. Berlin 10: 236. 1928.

Iryanthera microcarpa Ducke, Bol. Téch. Inst. Agron. Norte (Belém) 4: 8. 1945.

BRAZIL: Amazonas: Tabatinga, Igarapé Mariassú, *Ducke* 1510 (type coll. of *I. microcarpa*, US).

Ducke [6] has already noted the identity of his proposed species with *I. tessmannii*.

[6] Trop. Woods 90: 10. 1947.

Iryanthera macrophylla (Benth.) Warb. Bericht. Deutsch. Bot. Ges. **13:** (85). 1895.

VENEZUELA: Amazonas: Capihuara, Alto Casiquiare, alt. 120 m., "cuajo," *L. Williams* 15813 (US).

The cited collection is the first of this species from Venezuela that has come to my attention; it is otherwise known from British Guiana, Amazonian Brazil, and adjacent Peru.

Iryanthera crassifolia A. C. Sm. Brittonia **2:** 431. 1937.

Virola papillosa Ducke, Trop. Woods **90:** 10. 1947.

BRAZIL: Amazonas: Esperança, mouth of Rio Javary, *Ducke* 1911 (US, type coll. of *Virola papillosa*).

The type collection of *Virola papillosa* agrees excellently in foliage with material of *I. crassifolia*, known from Amazonian Peru and adjacent Brazil. Although *Ducke* 1911, in young fruit, is essentially glabrous, the few hairs which persist on the inflorescence are typically iryantheroid and 2-branched; the shape of immature fruit is not a dependable character in separating *Virola* from *Iryanthera*.

Iryanthera juruensis Warb. Verh. Bot. Ver. Brand. **17:** 137. 1905.

COLOMBIA: Vaupés: San José del Guaviare, on Río Guaviare, alt. 240 m., *Cuatrecasas* 7476 (US). El Valle: Pacific coast, Río Yurumanguí, Veneral, alt. 5–50 m., *Cuatrecasas* 15717 (A, Ch).

Not previously noted from Colombia but known to occur over a wide area in Amazonian Brazil and Peru. The occurrence of the species on the Pacific coast is especially noteworthy; the cited specimen is very typical of the species and cannot be confused with *I. ulei* Warb., which seems to be more abundant in Pacific Colombia.

Iryanthera ulei Warb. Verh. Bot. Ver. Brand. **47:** 137. 1905.

COLOMBIA: El Valle: Chocó region, Río Calima, La Trojita, alt. 5–50 m., *Cuatrecasas* 16287 (A, Ch), 16589 (A, Ch). Pacific coast, Río Cajambre, Silva, alt. 5–80 m., *Cuatrecasas* 17471 (A, Ch); Río Yurumanguí, Veneral, alt. 5–50 m., *Cuatrecasas* 15847 (A, Ch); Río Naya, Puerto Merizalde, alt. 5–20 m., *Cuatrecasas* 13955 (A, Ch), 14036 (A, Ch). Cauca: Pacific coast, Río Micay, Guayabal, alt. 5–20 m., *Cuatrecasas* 14123 (A, Ch).

Although *I. ulei* has already been reported from the Magdalena Valley, the excellent series of specimens cited above permits a noteworthy extension of range; these specimens are quite similar in all respects to typical ones from the Amazon Basin.

Iryanthera hostmanni (Benth.) Warb. Bericht. Deutsch. Bot. Ges. **13:** (84). 1895.

VENEZUELA: Bolívar: El Tigre, Bajo Caura, alt. 120 m., *L. Williams* 11793 (A, NY, US). La Prisión, Medio Caura, alt. 120 m., *L. Williams* 11704 (NY, US). Río Tonoro, Alto Río Paragua, alt. 300 m., *Cardona* 874 (A, US). Alto Caroni region, *Lasser* 1669 (US). Amazonas: Selva alta de Yavita, alt. 128 m., *L. Williams* 14144 (A, US).

The cited specimens are the first ones of the species from Venezuela which have come to my attention; otherwise I have known it from Surinam and French Guiana.

Iryanthera megistophylla A. C. Sm. sp. nov.

Arbor grandis androecio obovoideo minuto et antheris basi divergentibus *I. grandi* Ducke valde affinis, ramulis petiolisque multo robustioribus, foliorum laminis majoribus, nervis secundariis numerosis et intramarginalibus conspicuioribus, inflorescentia mascula validiore, perianthio minore facile distinguitur.

Large tree, to 30 m. high, the trunk up to 50 cm. in diameter; branchlets very robust (up to 15 mm. in diameter within 30 cm. of apices), irregularly angled and rugulose when dried, brownish or cinereous, copiously strigose on the youngest parts (hairs with ferruginous base and paler branches, minute, scarcely 0.2 mm. in total length, most often 2-branched), soon glabrescent; petioles stout (5–7 mm. in diameter), canaliculate, 18–26 mm. long, glabrous; leaf-blades coriaceous, essentially smooth on both surfaces, glabrous, oblong, 28–40 cm. long, 10–14 cm. broad, rounded or truncate at base, obtuse or obtusely cuspidate at apex, narrowly recurved at margin, the costa stout, very prominent and striate on both surfaces, the secondary nerves 22–25 per side, spreading, nearly straight, elevated (often in grooves) above, prominent beneath, conspicuously anastomosing 6–8 mm. within the margin, the veinlets immersed; staminate inflorescences 1–3 in leaf-axils or arising from internodes, fasciculate-racemose, up to 5 cm. long with some mature flowers but probably longer at full maturity, densely ferruginous-tomentellous on all exterior surfaces (hairs branched from base, the branches 0.1–0.2 mm. long, often several per hair but usually 1 or 2 the most obvious), the rachis stout (about 3 mm. in diameter), striate, the fascicles contiguous when young but eventually spaced on the rachis, each subtended by a broadly ovate concave bract about 1.5 mm. long and 2.5 mm. broad; flowers congested, apparently at least 10 per fascicle, subsessile, the pedicel less than 1 mm. long as observed but perhaps elongating, bracteolate at summit (bracteole 1-sided, about 0.4 mm. long and 1 mm. broad); perianth thick-carnose, subrotate, 1–1.2 mm. long at apparent maturity, 3-lobed nearly to base, the lobes ovate-deltoid, acute; androecium obovoid, sharply contracted at base, 0.5–0.6 mm. long and broad, the anthers 0.3–0.4 mm. long, dorsally adnate to the thick-carnose filament-column, divergent at base, contiguous at apex of androecium; old pistillate inflorescences apparently similar to the staminate, the pedicels (past anthesis) stout, up to 3 mm. long, the perianth apparently slightly larger than the staminate, the ovary glabrous; fruiting inflorescences apparently short, the rachis stout, the mature fruits few, pedicellate (pedicels up to 10 mm. long),

transversely ellipsoid, 3.5–4 cm. long, about 5 cm. broad, apparently obtusely cuspidate at apex, short-stipitate, the lateral extremities rounded, the pericarp woody, rugulose when dried, 4–7 mm. thick at the suture, the aril laciniate near apex with narrow lobes, the seed about 2 cm. long and 3.5 cm. broad.

Type in the herbarium of the Arnold Arboretum, collected at Sabaletas, valley of Río Anchicayá, western slope of Western Cordillera, Department of El Valle, Colombia, alt. 25 meters, November 16, 1945, by J. Cuatrecasas (No. 19866). Duplicate in Chicago Natural History Museum.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: El Valle: Chocó region, Río Calima, La Trojita, alt. 5–50 m., *Cuatrecasas* 16269 (A, Ch).

The minute perianth and androecium of this new species, contrasting so strongly with its robust branchlets and foliage, are of the type found in my species-group *Sagotianae*,[6] in which it is most closely related to the Amazonian *I. grandis* Ducke. Cuatrecasas notes his new plant as a large tree with fissured brownish bark and reddish wood; it yields a thin reddish resinous liquid, like most members of the family. The leaves are deep green or bright yellowish green (becoming brown in drying); the perianth is pale yellow within and brown-pubescent without; the fruit is green, with a red aril.

Osteophloem platyspermum (A. DC.) Warb. Bericht. Deutsch. Bot. Ges. **13:** (89). 1895.

COLOMBIA: El Valle: Pacific coast, Río Naya, Puerto Merizalde, alt. 5–20 m., *Cuatrecasas* 14022 (Ch), 14035 (A, Ch); Río Yurumanguí, Veneral, alt. 5–50 m., *Cuatrecasas* 15718 (A, Ch), 15780 (A, Ch), 15809 (A, Ch); Río Cajambre, Silva, alt. 5–80 m., *Cuatrecasas* 17494 (A, Ch).

The cited series of six specimens provides a fine record of this monotypic genus in Pacific Colombia; previously[7] I had cited only two collections of the species from Colombia, one from the Putumayo River and one (*Lehmann* 9044) without locality. It seems likely that Lehmann also obtained his specimen from low elevations near the Pacific coast, where he is known to have collected. The Cuatrecasas specimens are from trees up to 40 meters in height, and in most characters they agree excellently with my previous description of the species. However, it should be noted that the leaf-blades are sometimes abruptly cuspidate at apex, with a callose-tipped acumen about 5 mm. long, whereas the available Amazonian specimens have leaves either rounded or merely obtuse at apex. In floral characters the new Colombian material shows an extreme of size for the species, the perianth being 5–7 mm. in length, the androecium 3.5–4 mm. long, with the anthers about 3 mm. long and sometimes covering the connective mass to its apex. These more robust floral aspects, however, do not seem to

[6] Brittonia **2:** 426–427, and *fig. 4, f, g,* on p. 428. 1937.
[7] Brittonia **2:** 453. 1937.

provide grounds for recognizing the Pacific Colombian material nomenclaturally.

Virola cuspidata (Benth.) Warb. Nova Acta Acad. Leop.-Carol. 68: 176. 1897.

COLOMBIA: Vaupés: Bank of Río Vaupés, between Mitú and Mirití, alt. 200 m., *Cuatrecasas* 6918 (US). Caquetá: Florencia, wooded hills at Buenavista, alt. 450 m., *Cuatrecasas* 8881 (US).

Not previously recorded from Colombia, although it has been known from the adjacent Vaupés region in Brazil; it is a common species in Amazonian Brazil and adjacent Peru.

Virola elongata (Benth.) Warb. Bericht. Deutsch. Bot. Ges. 13: (89). 1895.

COLOMBIA: Meta: Villavicencio, toward El Parrao, alt. 500 m., *Cuatrecasas* 4594 (US). About 20 km. southwest of Villavicencio, alt. about 500 m., *Killip* 34252 (NY, US). El Valle: Pacific coast, Río Cajambre, Barco, San Isidro, and Silva, alt. 5–100 m., *Cuatrecasas* 17025 (A, Ch), 17345 (A, Ch), 17372 (A, Ch).

Previously I have recorded only one collection of this species from Colombia, from the Peruvian boundary. The species is abundant in Amazonian Brazil and Peru, and its occurrence in Meta was expected, but the localities on the Pacific coast are noteworthy.

Virola macrocarpa A. C. Sm. Brittonia 2: 476. 1937.

COLOMBIA: El Valle: Pacific coast, Río Cajambre, Silva, alt. 5–80 m., *Cuatrecasas* 17540 (A, Ch). Chocó region, Río Calima, La Trojita, alt. 5–50 m., *Cuatrecasas* 16613 (A, Ch). Western slope of Western Cordillera, valley of Río Sanquininí, left side, La Laguna, alt. 1,250–1,400 m., *Cuatrecasas* 15596 (A, Ch).

Virola macrocarpa has previously been known only from the type collection, in fruit, collected in the Department of Boyacá at about 1,100 meters altitude. The additional material cited above is of considerable interest, as it extends the range of the species to the Western Cordillera and down to sea level on the Pacific coast. *Cuatrecasas* 15596 and 16613 bear young unexpanded (pistillate?) inflorescences; in foliage they closely match the type collection and so I refer them to the species with confidence. No. 17540, however, has leaves considerably smaller, although similar in texture, shape, and indument. This specimen bears staminate inflorescences. If it is correctly placed in *V. macrocarpa*, the position which I previously assigned to that species as a member of the species-group *Calophyllae* is open to question; on the basis of the staminate flowers now available, the species may be better referred to the species-group *Surinamenses*, in which its relationship appears to be with *V. guatemalensis* (Hemsl.) Warb. A more complete series of specimens from Colombia will eventually permit a better understanding of the entity, but for the present a description of the staminate inflorescence of *Cuatrecasas* 17540 follows. The pubescent inner surface of the perianth is a particularly noteworthy feature.

Staminate inflorescences axillary, broadly paniculate, many-flowered, up to 7 cm. long and broad, freely (4 or 5 times) branched, minutely ferruginous-tomentellous on all exterior surfaces (hairs stellate-sessile, 6–8-branched, about 0.1 mm. in total diameter), the peduncle (1–1.5 cm. long) and branchlets slightly flattened, the bracts apparently small and soon caducous; flowers in ultimate clusters of 4–8, the pedicels about 1.5 mm. long; perianth carnose, 2.5–3 mm. long, copiously but minutely pilose within with simple yellowish hairs about 0.2 mm. long, 3-lobed for slightly more than half its length, the lobes deltoid, obtuse; androecium about 1.8 mm. long, the filament column slightly contracted at apex, the anthers 3, subequal in length to the column, connate to apex, subacute.

Virola atopa A. C. Sm. sp. nov.

Arbor grandis, ramulis petiolisque robustis dense stellato-tomentellis, foliorum laminis magnis conspicue nervatis subtus copiose tomentosis; a speciebus adhuc notatis fructibus magnis longitudinaliter conspicue costatis apice rostratis distinguenda.

Tree to 20 m. high, the trunk 20 cm. in diameter, the branchlets terete, robust, 7–9 mm. in diameter toward apices, when young densely ferruginous-tomentellous (hairs unevenly sessile-stellate, with 4–8 branches, about 0.2 mm. in total diameter), at length glabrescent; petioles stout, about 7 mm. in diameter, flattened above, 20–25 mm. long, persistently tomentellous; leaf-blades subcoriaceous, brownish when dried, paler beneath, elliptic-oblong, 40–45 cm. long, 17–20 cm. broad, rounded at base and decurrent on the petiole, short-cuspidate at apex (actual apex rounded), nearly plane at margin, glabrous above or sparsely pilose along the costa proximally, very densely ferruginous-tomentose beneath (hairs sessile-stellate, about 0.2 mm. in diameter, the branches 6–10, subequal, paler than the dark center), the costa conspicuously raised above and very prominent beneath, 2–4 mm. thick, the secondary nerves 25–27 per side, spreading, slightly curved, conspicuously anastomosing about 5 mm. within the margin, with the undulating marginal nerve shallowly impressed above and sharply prominent beneath, the tertiary nerves subparallel, slightly impressed above and prominulous beneath; flowering inflorescences not seen; fruiting inflorescences arising from branchlets below leaves, apparently solitary or paired, comparatively simple, with about 3 fruits congested at apex of a short peduncle, this terete, about 1 cm. long and 5 mm. in diameter, copiously tomentellous like the branchlets; fruits apparently subsessile, ovoid, 45–55 mm. long, 35–40 mm. broad, conspicuously rostrate with a blunt apex 5–10 mm. long, sharply circumcarinate (not dehiscent as far as observed) and also with 8–10 subsidiary longitudinal costae, these less sharp and less regular than the carina, projecting 1–3 mm. from the surface; pericarp copiously

and persistently tomentellous with irregular sessile-stellate few-branched hairs 0.1–0.2 mm. in diameter, coriaceous, 2–3 mm. thick; aril not observed, presumably very thin and readily drying, the seed ellipsoid-ovoid, up to 35 mm. long and 28 mm. broad.

Type in the herbarium of the Arnold Arboretum, collected at La Trojita, Río Calima, Chocó region, Department of El Valle, Colombia, alt. 5–50 meters, between February 19 and March 10, 1944, by J. Cuatrecasas (No. 16285). Duplicate in the Chicago Natural History Museum.

It seems certain that the plant described above belongs to the Myristicaceae, as indicated by its general facies, type of indument, type of sap, and the general form of its 1-seeded, carinate (and presumably 2-valved) fruit. Unfortunately the fruits are so dried that no trace of an aril is present, while only the shell remains of the seeds. Because of the unique features of its fruits, which are rostrate at apex and with conspicuous subsidiary costae in addition to the sutural carinae, I hesitate to refer the plant to *Virola*, but its indument indicates this position for it. It is possible, of course, that *V. atopa* represents an undescribed genus. In *Virola* it cannot definitely be assigned a position in one of the existing species-groups, although a relationship to some species of the *Rugulosae* (e. g., *V. rugulosa* Warb.) may be indicated.

The collector's notes state that the bark is light brown, reddish brown in section and with chocolate-colored sap, which is resinous and which forms a film on the scaly surface; the wood is reddish; the leaves are thick, coriaceous, distichous, dark yellowish green above, and cinnamon-colored beneath; the endosperm is edible.

Virola venosa (Benth.) Warb. Nova Acta Acad. Leop.-Carol. 68: 224. 1897.

VENEZUELA: Amazonas: In forest along the road to Yavita, alt. 128 m., *L. Williams* 13954 (US).

Although this species is fairly abundant in the central part of Amazonian Brazil, this appears to be the first authentic record of it from Venezuela.

Virola pavonis (A. DC.) A. C. Sm. Brittonia 2: 504. 1937.

VENEZUELA: Amazonas: San Carlos de Río Negro, alt. 100 m., *L. Williams* 14579 (A, US).

The cited specimen provides a new but not unexpected record for Venezuela, the species having previously been known from Amazonian Brazil and Peru.

Virola carinata (Benth.) Warb. Nova Acta Acad. Leop.-Carol. 68: 222. 1897.

COLOMBIA: Meta: Vicinity of Villavicencio, near Peralonso, alt. 450 m., "guajo", *Jaramillo, Mesa, Idrobo, & Fernández* 359 (US).

Although this species is frequent in Amazonian Brazil and Venezuela, I have not previously seen specimens from Colombia.

HIPPOCRATEACEAE

Anthodon decussatum R. & P. Fl. Peruv. Chil. 1: 45. *pl.* 74, *b.* 1798.

COLOMBIA: Magdalena: Northern flank of the Sierra Nevada de Santa Marta, *R. Romero C.* 784 (US).

In mentioning this plant as being new to the Colombian flora,[8] I listed a specimen from the Magdalena Valley in Santander. The second known specimen from Colombia, cited above, is also noteworthy; although it consists only of fruits and a few detached leaves, these are highly characteristic for the species and cannot be mistaken.

Salacia insignis A. C. Sm. Brittonia 3: 435. 1940.

PERU: Loreto: Mishuyacu, near Iquitos, alt. 100 m., *Klug* 13 (US).

BRAZIL: Amazonas: Basin of Rio Madeira, Municipality Humayta, near Livramento, on Rio Livramento, *Krukoff* 6799 (NY), 6991 (NY, US), 7043 (NY).

Previously I have recorded only the type collection of this species, *Klug* 74, from the same locality as his No. 13. The additional specimens now cited were overlooked when I described the species; they are essentially identical with the type, but the Brazilian collections are indicated as shrubs or small trees 5–8 meters high and have smaller leaves than those originally described. The petioles of specimens now available are sometimes only about 8 mm. long, while the leaf-blades may be as small as 15 by 5 cm., or even smaller on younger parts of the plant; the secondary nerves are occasionally as few as 8 or 10. Inflorescences toward the apices of branchlets are considerably smaller than those of the type specimen, often only 7–10 cm. long, but available flowers (*Klug* 13, *Krukoff* 6991) are quite typical. *Krukoff* 6799 and 7043 bear fruits, which are subglobose, 3–3.5 cm. in diameter, the pericarp being 1.5–2 mm. thick; the seeds are several (possibly as many as 6 per fruit), ellipsoid-oblong, 18–20 mm. long, 8–10 mm. broad. In spite of the differences in habit and size of leaves and inflorescences, the cited specimens seem indubitably to fall into *S. insignis*, of which the type was apparently an unusually robust specimen.

Salacia spectabilis A. C. Sm. Brittonia 3: 436. 1940.

BRAZIL: Amazonas: Esperança, mouth of Rio Javary, Lago de Genipapo, igapó, *Ducke* 1574 (A, US).

The second collection of this highly distinctive species agrees very closely with the type, from the Río Itaya in adjacent Peru. The collector's notes describe the plant as a small tree, the flowers being green with the apices of petals dark red.

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[8] Journ. Arn. Arb. 27: 87. 1946.

Salacia multiflora (Lam.) DC. Prodr. 1: 570. 1824.

COLOMBIA: El Valle: Pacific coast, Río Cajambre, Barco, alt. 5–80 m., *Cuatrecasas* 17246 (A, Ch). Chocó region, Río Calima, Quebrada de La Brea, alt. 20–40 m., *Cuatrecasas* 21295 (Ch, US).

These extremely interesting collections are perfectly typical for the species, which is thus first reported from Colombia. I had earlier [9] known it only from the Guianas and Amazonian Brazil, but Dr. Steyermark has recently obtained specimens in Venezuela. However, all the previously known localities are far removed from the Pacific coast of Colombia.

Salacia impressifolia (Miers) A. C. Sm. Bull. Torrey Club 66: 247. 1939.

COLOMBIA: Vaupés: Bank of Río Cuduyarí, tributary of Río Vaupés, alt. 200 m., *Cuatrecasas* 6824 (US).

New to Colombia; in my earlier treatment of this species [10] I cited specimens from Amazonian Brazil and adjacent Peru and Bolivia. The type collection comes from the Vaupés River, probably not far below the locality cited above. Cuatrecasas states that the fruit is edible.

Salacia duckei A. C. Sm. sp. nov.

Frutex scandens, *S. solimoesensi* A. C. Sm. et *S. cauliflorae* A. C. Sm. affinis, foliorum laminis basi attenuatis et margine serrulatis, nervis secundariis paucioribus impressis, ovulis 2 distinguitur; a priore foliorum laminis multo minoribus et floribus omnino majoribus etiam recedit; a posteriore inflorescentia axillari pauciflora, pedicellis multo brevioribus, floribus minoribus differt.

Liana, glabrous throughout, the branchlets slender, subterete, slightly flattened at nodes, gray to purplish, copiously lenticellate; leaves opposite, the petioles rugulose, canaliculate, slender, 8–12 mm. long, the leaf-blades coriaceous, apparently shining above and duller beneath, olivaceous when dried, lanceolate-oblong, (7–) 10–12 cm. long, (2.5–) 3.5–5.3 cm. broad, attenuate at base and decurrent on the petiole, gradually narrowed distally to a subacute acumen about 5 mm. long, slightly thickened and recurved at margin and undulate-serrulate (teeth 2 or 3 per centimeter, often inconspicuous), the costa prominent on both surfaces, the secondary nerves 6 or 7 per side, arcuate-ascending, inconspicuous, slightly impressed on both surfaces, the veinlet-reticulation immersed or slight impressed; inflorescences axillary or arising from defoliate branchlets, fasciculate, apparently 4–8-flowered but with some flowers caducous, the peduncle gemmiform, the bracts

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[9] Brittonia 3: 441–445. 1940.
[10] Brittonia 3: 447–449. 1940.

crowded, minute; flowers 8–9 mm. in diameter at anthesis, the pedicels sparsely farinose-ceriferous, 4–5 mm. long at anthesis; sepals deltoid-suborbicular, 1–1.5 mm. long, 1–2 mm. broad, rounded at apex, scariose toward the entire margin, white-lineolate-glandular; petals rotate or subspreading at anthesis, submembranaceous, elliptic, 4–4.5 mm. long, 3–4 mm. broad, rounded at apex, entire and conspicuously recurved at margin; disk carnose, annular-pulvinate, about 3 mm. in diameter and 1 mm. high, rounded at outer margin; stamens suberect, the filaments ligulate, about 1.5 mm. long, the anthers transversely ellipsoid, about 0.4 by 0.7 mm., dehiscing by horizontal apical confluent clefts; disk, ovary, and style with copious immersed whitish glands, the ovary conical, the style about 0.8 mm. long; ovules 2 per locule, obliquely superposed.

Type in the U. S. National Herbarium, No. 1908110, collected on "mata da terra firme" at Esperança, mouth of Rio Javary, State of Amazonas, Brazil, March 15, 1944, by A. Ducke (No. 1575). Duplicate in the herbarium of the Arnold Arboretum.

The collector's notes indicate that the plant is a large liana, the flowers being dull pale yellow with a dark reddish center. The only close allies of the new species, *S. solimoesensis* A. C. Sm. and *S. cauliflora* A. C. Sm., also occur in the basin of the Solimoes River; combinations of fairly obvious characters readily differentiate the three species.

Cheiloclinium habropodum A. C. Sm. sp. nov.

Frutex scandens *C. klugii* A. C. Sm. et *C. hippocrateoidi* (Peyr.) A. C. Sm. affinis, foliorum laminarum nervis secundariis numerosis patentibus et rete venularum immersis haud prominulis distinguendus; a priore foliorum laminis majoribus basi obtusis, pedicellis brevioribus, floribus minoribus, stigmatibus profunde bifidis recedit; a posteriore inflorescentiae pedunculo multo longiore etiam differt.

Liana, glabrous throughout, the branchlets slender, subterete, pale brown, slightly flattened at nodes; leaves opposite, the petioles stout, rugose, canaliculate, 10–12 mm. long, the leaf-blades chartaceous, remaining green when dried, elliptic-oblong, 12–18 cm. long, (4.5–) 6–8 cm. broad, broadly obtuse at base and decurrent on the petiole, cuspidate at apex (acumen 5–10 mm. long, obtuse), slightly thickened and entire at margin or obscurely undulate-crenulate distally, the costa prominent on both surfaces, the secondary nerves 10–14 per side, spreading, curved and obscurely anastomosing toward margin, nearly plane or faintly prominulous on both surfaces, the veinlet-reticulation immersed; inflorescences axillary, apparently solitary, at maturity 5–7 cm. long and broad, 6–8 times dichotomously branched, the branchlets slender, terete, striate when dried, the peduncle 2–3 cm. long, the bracts and bracteoles papyraceous, deltoid, 0.5–1 mm. long;

mature flowers about 2 mm. in diameter, solitary or paired at ends of ultimate branchlets but apparently not occurring in the dichotomies; pedicels slender, terete, 1–1.5 mm. long; sepals submembranaceous, ovate-deltoid, 0.4–0.5 mm. long and broad, subacute, erosulous-margined; petals thin-carnose, elliptic-oblong, about 1 mm. long and 0.8 mm. broad, rounded at base and apex, very faintly erosulous at margin; lips of the disk carnose, about 0.5 mm. broad; filaments ligulate, about 0.5 mm. long, the anthers transversly ellipsoid, minute, scarcely 0.1 mm. broad; ovary about 0.8 mm. in diameter at anthesis, with copious immersed pale mucilaginous glands, the stigmas deeply bifid and free only at apices, the ovules 2 per locule, superposed.

Type in the U. S. National Herbarium, No. 1876374, collected at Capihuara, Alto Casiquiare, State of Amazonas, Venezuela, alt. 120 meters, June 1, 1942, by Llewelyn Williams (No. 15720).

A member of the species-group *Hippocrateoides* as defined in my revision[11], *C. habropodum* is readily distinguished from its closest relatives, *C. klugii* A. C. Sm. and *C. hippocrateoides* (Peyr.) A. C. Sm., as stated in the above diagnosis. The collector's notes state that the common name is "gengibrillo"; the plant is a liana, with minute yellowish flowers and spherical bright yellow fruits, of which the pulp is edible and sweet; it climbs on trees of the forested and flooded riverbank.

Cheiloclinium hippocrateoides (Peyr.) A. C. Sm. **Brittonia 3: 546. 1940.**

COLOMBIA: Vaupés: Macú-paraná, *P. H. Allen* 3077 (US).

The cited specimen provides the first Colombian record of this widespread species, to which I have referred specimens from Guiana, Amazonian Peru, Bolivia, and Brazil. Possibly the concept outlined in my revision is too broad, but the specimens from these areas agree in essential floral characters, differing principally in leaf-size and -shape. Allen's plant is very similar to *Klug* 154, from Peru.

ERICACEAE

Befaria nana A. C. Sm. & Ewan, sp. nov.

Frutex nanus a speciebus omnibus generis valde dispar, *B. cubensi* Griseb. et *B. ledifoliae* Humb. & Bonpl. affinis, habitu confertissimo, omnium partium parvitate, praesertim floribus subsessilibus multo minoribus facile distinguitur.

Shrub, compact in habit and apparently very small; branchlets copiously marked with leaf-scars, the internodes negligible, the young parts viscid-pilose with slender castaneous gland-tipped hairs about

[11] Brittonia 3: 528–529. 1940.

1 mm. long and also closely cinereous-tomentellous, the older parts tomentellous but eventually glabrescent; leaves extremely congested toward apices of branchlets, the petioles 1–2 mm. long, deciduously tomentellous, the blades coriaceous, essentially glabrous and shining above, sparsely tomentellous beneath at least along the costa, oblong-linear, 5–8 mm. long, 1–2 mm. broad, narrowed at base, callose-obtuse at apex, conspicuously and tightly revolute at margin, the reflexed upper surface completely obscuring the lower surface, the costa faintly impressed above; inflorescence terminal, short-racemose, congested, forming a compact mass not more than 2 cm. in diameter (including flowers), the rachis stout, viscid, pubescent like the branchlets but with the glandular hairs very delicate and about 0.5 mm. long, the bracts foliaceous but greatly reduced; flowers subsessile, the pedicels less than 1 mm. long, stout, bibracteolate (bracteoles linear, about 2 mm. long, appressed to the calyx); calyx subcampanulate, about 3 mm. long, copiously viscid-glandular-hispidulous with minute whitish hairs, 7-lobed, the lobes broadly imbricate, ovate, about 1.5 mm. long and broad, erose-margined, obtuse; petals apparently 6 or 7, subcarnose, glabrous, narrowly obovate, at anthesis 9–10 mm. long, 3–3.5 mm. broad, gradually narrowed at base, rounded at apex; stamens 12–15, apparently slightly shorter than the petals, the filaments very slender, copiously puberulent except toward apex, the anthers oblong, about 1 mm. long; ovary glabrous, slightly depressed at apex, laterally furrowed from pressure of filaments, the style stout, terete, slightly longer than the petals, swollen distally; capsule 3–4 mm. in diameter, apparently 5- or 6-valvate.

Type in the U. S. National Herbarium, No. 1833475, collected on Tres Tetas (south peak), Sierra Perijá, Department of Magdalena, Colombia, alt. 3,000 meters, April 28–May 4, 1942, by M. A. Carriker, Jr. (No. 16).

The plant described above is one of the most distinct species of *Befaria*, characterized by conspicuously revolute leaf-blades and a type of glandular pubescence found elsewhere, in combination, only in *B. cubensis* Griseb. and *B. ledifolia* Humb. & Bonpl. Neither of these species, however, approaches *B. nana* in extreme reduction in size of parts.

Befaria peruviana Mansf. & Sleumer, Notizbl. Bot. Gart. Berlin 12: 268. 1935.

ECUADOR: Azuay: Between Kilometer 67 and south toward Oña, alt. 3,715 m., *Steyermark* 53663 (A, Ch).

The species has previously been reported only from the type collection in the Department of Cajamarca, Peru; our specimens match a duplicate of the type (*Weberbauer* 6106, US) very closely. In Azuay the plant is a shrub more than 1 m. high, growing in dense patches, with a very showy deep rose-pink corolla; it is known as "payama."

Leucothoe venezuelensis A. C. Sm. sp. nov.

Frutex ramulis petiolisque gracilibus puberulis, laminis foliorum basi attenuatis et margine valde recurvatis distinguitur; *L. duckei* Huber valde affinis, petiolis paullo longioribus, laminis foliorum obovato-oblongis et basi distinctius attenuatis, calycis lobis conspicue acuminatis, corolla ore abruptius contracta et lobis paullo longioribus differt; a *L. albiflora* Fedtsch. & Basil. basi foliorum, racemis brevioribus, et pedicellis longioribus facile distinguendus.

Shrub 4–5 m. high, the branchlets subterete or slightly angled, slender, at first copiously white-puberulent, glabrescent; petioles canaliculate, very slender (0.5–0.7 mm. in diameter), puberulent like the branchlets; leaf-blades coriaceous, olivaceous when dried, prevailingly obovate-oblong, (2.5–) 3–4.5 cm. long, 1–1.7 cm. broad, gradually narrowed at base, conspicuously and often abruptly mucronate at apex with a tip about 2 mm. long, sharply recurved or narrowly revolute at margin, faintly puberulent on the costa beneath and otherwise essentially glabrous, the costa sharply impressed above and prominent beneath, the lateral nerves numerous, copiously interconnected by a reticulation which is obscure above and faintly raised beneath; inflorescence axillary or arising from branchlets below leaves, often crowded, the rachis slender, 2–3 cm. long, persistently white-crispate-puberulent like the pedicels, bracts, and bracteoles; pedicels subterete, very slender, 5–7 mm. long, each subtended by a subulate bract 1–1.5 mm. long and similarly bibracteolate near base, swollen distally and readily disarticulating just below the calyx; calyx rotate, at anthesis about 5 mm. in diameter, uniformly pale-puberulent without, the lobes ovate-triangular, about 1.5 mm. long and broad, sharply narrowed at apex into an acumen about 0.5 mm. long; corolla cylindric-urceolate, 6–7 mm. long, about 2.5 mm. in diameter, strongly contracted at throat, the lobes spreading, oblong, about 1 mm. long, obtuse; filaments ligulate, very slender, about 4 mm. long, obviously crispate-pilose, distally inflexed, the anthers about 1 mm. long, the tubules very short, dehiscing by broad oval subterminal pores; ovary 5- or rarely 6-lobed, puberulent, soon glabrescent, the style stout, terete, obscurely puberulent at anthesis; mature capsule depressed-globose, 5–6 mm. in diameter, glabrous, the calyx persistent, the seeds very numerous, pale brown, falcate-linear, about 3 mm. long.

Type in the U. S. National Herbarium, No. 1908090, collected on Cerro Akurimá, Gran Sabana, State of Bolívar, Venezuela, in March 1946, by F. Tamayo (No. 3236).

The closest relationship of this new species appears to be with *L. duckei* Huber, from the western part of the State of Pará, Brazil, from which it differs as mentioned in the diagnosis above. The new

species is less closely related to *L. albiflora* Fedtsch. & Basil. and other Andean species proposed by Sleumer.[12]

Tepuia Camp, Brittonia 3: 178–184. *figs. 4, 5.* 1939.

The remarkable genus *Tepuia*, based upon three species known only from Auyan-tepuí in southern Venezuela, is certainly, as Camp implies in his analysis, a very sharply marked entity. Its most obvious characters, the foliar marginal leaf-glands and the connate apical pedicellary bracteoles, at once distinguish it from other Ericaceae of the American Tropics. The three original species are all characterized by their small revolute leaf-blades. A fourth species from Auyan-tepuí, with comparatively large leaves and inflorescences, is described below as *T. speciosa.* The first known collection of the genus from elsewhere than Auyan-tepuí is here described as a fifth species, *T. cardonae;* this plant comes from the nearby Cerro Acopán and in size of leaves is somewhat intermediate between *T. speciosa* and the other known species. *Tepuia* is thus now known from five species, all clearly distinct but certainly not abundantly collected. The discovery of other species on the Venezuelan sandstone mountains belonging to this spectacular genus is to be anticipated.

Tepuia speciosa A. C. Sm. sp. nov.

Species inter congeneros omnium partium magnitudine, ramulorum et foliorum tomento copioso facile distinguenda; a *T. tatei* Camp etiam floribus numerosis, calyce et corolla tomentosis, filamentis dense strigoso-sericeis, ovario copiose pubescente valde differt.

Apparently a shrub, the branchlets stout, terete, distally subflexuose, copiously and closely ferruginous-tomentose, the hairs becoming grayish and presumably eventually falling; petioles subterete, 8–11 mm. long, tomentose like the branchlets; leaf-blades coriaceous, elliptic-oblong, (4–) 5–6.5 cm. long, (1.5–) 2–4 cm. broad, acute at base and gradually decurrent on the petiole, obtuse at apex, narrowly revolute at margin and bearing 3 or 4 conspicuous supramarginal glands on each side near the petiole, ferruginous-tomentellous above when young and soon glabrescent and yellowish green when dried, persistently and very densely ferruginous-velutinous beneath with a thick layer of fine tangled hairs, pinnate-nerved, the costa impressed above, strongly elevated beneath, the secondary nerves 3–5 per side, arcuate-ascending, nearly plane above, slightly raised beneath, the veinlet-reticulation immersed; inflorescence axillary or arising from efoliate nodes near apices of branchlets, racemose, 5–10-flowered, the rachis stout, terete, subflexuose, with the pedicel copiously and very closely ferruginous-tomentose, 2–3 cm. long, the flowers each subtended by a coriaceous lanceolate bract, these 3–4 mm. long, 1.5–2 mm. broad, acute, tomentose

[12] Notizbl. Bot. Gart. Berlin 12: 131. 1934; 478–480. 1935.

like the rachis without, glabrous within; pedicels stout, terete, at anthesis 3–6 mm. long, surmounted by 2 basally connate bracteoles, these subcoriaceous, broadly ovate, about 2.5 mm. long and 3 mm. broad, obtuse, tomentose without, glabrous within; calyx leathery, cupuliform-rotate, at anthesis 10–12 mm. in diameter, closely ferruginous-tomentose without, deeply 5-lobed, the lobes oblanceolate-oblong, about 6 mm. long, 3–3.5 mm. broad, broadest distally and suddenly narrowed to an acute apex, densely and closely ochraceous-tomentose near apex but otherwise glabrous within, the midvein raised on the inner surface; corolla thin-carnose, broadly campanulate at anthesis, 9–10 mm. long, about 15 mm. in apical diameter, copiously ferruginous-tomentose without with fine tangled hairs 1–2 mm. long, glabrous within, deeply 5-lobed, the lobes broadly ovate-deltoid, about 5 mm. long, 6–7 mm. broad, subacute, slightly reflexed at margin; stamens 10, about 7 mm. long, the filaments ligulate, slightly incurved, 4–5 mm. long, narrowed at base, broadest just above base and tapering distally, conspicuously and very densely strigose-sericeous dorsally with stramineous hairs 1–2 mm. long, glabrous within, the anthers 3–3.5 mm. long, finely granular, the thecae about 2 mm. long, rounded (not mucronulate) at base, the tubules rigid, shorter than the thecae, dehiscing by short oval introrse pores; disk bordered by 10 pale glabrous fleshy oblong appendages about 0.3 mm. long; ovary depressed-globose, deeply 5-sulcate, at anthesis about 2.5 mm. high and 4 mm. in diameter, copiously pubescent like the filaments, 5-loculate, the ovules 25–30 per locule, imbricate in a mass on small placentae, the style stout, terete, glabrous, about 4 mm. long, the stigma minute.

Type in the U. S. National Herbarium, No. 1693757, collected on Mount Auyantepuí, State of Bolívar, Venezuela, in September 1937, by F. Cardona (No. 257). Fragment in the herbarium of the New York Botanical Garden.

Tepuia speciosa, while agreeing in essential characters with the three species of the genus already described, differs from them markedly in the greater size of all its vegetative parts. Whereas the other species have leaves with 2 (rarely 3 or 4) supramarginal basal glands, those of *T. speciosa* appear always to have 3 or 4 such glands per side. Although *T. tatei* Camp more nearly approaches the new species in size of parts than do the other known species, it has leaf-blades with a maximum size of 2.5 by 0.8 cm.; its merely puberulent rachis is less than 1 cm. long and with only 1 to 4 flowers, its calyx and corolla are essentially glabrous, its filaments are less copiously pilose, and its ovary is glabrous.

Previously and very carelessly I identified *Cardona* 257 as *Notopora schomburgkii* Hook. f., and as such it was cited [13] in 1939. *Notopora*

[13] Brittonia 3: 185. 1939.

has only a superficial resemblance, in foliage and indument, to *T. speciosa*, and it has not yet been observed on Auyan-tepuí.

Tepuia cardonae A. C. Sm. sp. nov.

Frutex *T. speciosae* supra descriptae affinis, ramulis hispidis ac etiam tomentellis, petiolis brevioribus, foliorum laminis minoribus cum glandulis marginalibus paucioribus, inflorescentia breviore graciliore, pedicelli bracteolis floribusque minoribus, antheris basi mucronulatis differt.

Shrub about 3 m. high, the branchlets slender, terete, distally subflexuose, hispid with stiff castaneous eglandular (or very obscurely apically glanduliferous) hairs 1–2 mm. long and also closely ferruginous- or grayish-tomentellous, at length glabrescent; petioles terete, 3–4 mm. long, pilose like the branchlets or merely tomentellous; leaf-blades coriaceous, ovate-elliptic, (2–) 3.5–5 cm. long, (1–) 1.5–2.5 cm. broad, obtuse at base, obtusely mucronulate at apex, conspicuously revolute at margin and bearing 1 or 2 conspicuous supramarginal glands on each side near base, pale-puberulent above when young and soon glabrescent and pale green when dried, persistently and closely ferruginous-tomentose beneath, pinnate-nerved, the costa impressed above, prominent beneath, the secondary nerves 3–5 per side, arcuate-spreading, anastomosing, nearly plane above, raised beneath, the veinlets immersed; inflorescence axillary toward apices of branchlets or subterminal, racemose, 2–8-flowered, the rachis slender, terete, strongly flexuose, 0.5–2 cm. long, with the pedicel copiously ferruginous-tomentose, at length merely puberulent or glabrescent; flower-subtending bracts subcoriaceous, lanceolate-oblong, 1–2 mm. long, about 1 mm. broad, obtuse, tomentellous without, glabrous within; pedicels slender, terete, at anthesis 4–7 mm. long, the apical bracteoles basally connate, ovate, about 1.5 mm. long and 2 mm. broad, tomentellous without, glabrous within; calyx at anthesis 8–10 mm. in apical diameter, tomentose without like rachis, deeply lobed, the lobes 5 (rarely 6 or 7), lanceolate-oblong, about 5 mm. long and 3 mm. broad, acute, ferruginous-tomentellous distally and at margin but otherwise glabrous within, the midvein scarcely obvious; corolla thin-carnose, broadly campanulate, at anthesis about 7 mm. long and 7–9 mm. in apical diameter, ferruginous-tomentellous without, glabrous within, deeply 5-lobed, the lobes deltoid, about 3 mm. long, 4–5 mm. broad, acute and reflexed at apex; stamens 10, about 5 mm. long, the filaments ligulate, 3–3.5 mm. long, densely strigose-sericeous dorsally with yellow-brown hairs about 1 mm. long, glabrous within, the anthers about 2.5 mm. long, the thecae finely granular, about 1.5 mm. long, mucronulate at base, the tubules slender, dehiscing by flaring oval introrse pores; disk-appendages inconspicuous, fleshy, glabrous; ovary depressed-globose,

5-sulcate, at anthesis about 3 mm. high and 5 mm. in diameter, copiously ferruginous-tomentose, 5-locular, the ovules numerous, massed on small stalked placentae, the style slender, glabrous, about 3.5 mm. long, the stigma minutely capitate.

Type in the U. S. National Herbarium, No. 1932235, collected on Cerro Acopán, Río Caroni, State of Bolívar, Venezuela, alt. 2,000 meters, in October 1947, by F. Cardona (No. 2300).

Although in general aspect, leaf size, and indument the new species approaches *T. speciosa* A. C. Sm. more closely than it does any of the original three species of *Tepuia*, it is readily distinguished as mentioned in the above diagnosis. In its basally mucronulate anthers *T. cardonae* resembles *T. tatei*, and its reduced number of supramarginal foliar glands also suggests that species.

Gaultheria elassantha A. C. Sm. sp. nov.

Species foliis parvis, floribus solitariis, corolla breviter campanulata distinguitur; a *G. pubescente* Fedtsch. & Basil. foliorum laminis angustioribus, pedicellis pilis brevioribus hispidulis non puberulis, forma corollae glabrae, filamentis antherisque brevioribus, ovario glabro vel obscurissime puberulo recedit; a *G. secunda* Remy ramulis pedicellisque strigosis sed non puberulis, filamentis brevioribus, antheris aristas conspicuas gerentibus, ovario haud piloso differt.

Tree about 4 m. high or scrambling shrub, the branches freely divided distally and copiously leafy, the branchlets slender, terete, strigose with pale brown eglandular hairs 0.7–1 mm. long, eventually glabrescent; petioles canaliculate, 1–3 mm. long, strigose like the branchlets; leaf-blades coriaceous, brownish when dried, elliptic-oblong, 1.3–3 cm. long, 0.5–1.2 cm. broad, obtuse or rounded at base, callose-apiculate at apex, slightly recurved and serrulate at margin (teeth 5–9 per centimeter, callose-mucronulate or rigidly ciliate), glabrous above or obscurely puberulent along nerves, scattered-strigose beneath with hairs like those of the branchlets, pinnatinerved, the costa nearly plane above, elevated beneath, the secondary nerves about 3 per side, curved-ascending, slightly elevated on both surfaces, the veinlet reticulation prominulous on both surfaces or obscure; flowers solitary in the axils of distal leaves on the branchlets, these leaves sometimes reduced and bractlike, the flowers then appearing to be in short terminal racemes; pedicels 4–7 mm. long at anthesis, hispidulous with slender eglandular or obscurely glandular hairs 0.2–0.5 mm. long, bibracteolate near base, the bracteoles ovate-deltoid, 1–2 mm. long, acute, obscurely glandular-margined and puberulent distally; calyx deeply 5-lobed, the lobes deltoid, 2–2.5 mm. long, 1.5–2 mm. broad, acute, closely puberulent within; corolla short-campanulate, at anthesis about 5 mm. long and 5–6 mm. in apical diameter, glabrous, the lobes 5, broadly deltoid, acute, about 1.5 mm. long and 2.5 mm.

broad, reflexed at anthesis; stamens much shorter than corolla, the filaments about 1.5 mm. long, glabrous, obscurely scabridulous, contracted at base and apex, the anthers 1–1.2 mm. long including the awns, these inconspicuous, about 0.4 mm. long; ovary depressed-globose, glabrous or very obscurely puberulent, about 2 mm. in diameter at anthesis, the style stout, glabrous, about 2.5 mm. long at anthesis.

Type in the U. S. National Herbarium, No. 1517466, collected at La Sierra, 18 km. north of Medellín, Department of Antioquia, Colombia, alt. about 2,000 meters, in January 1931, by W. A. Archer (No. 1499).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Antioquia: La Sierra, 18 km. north of Medellín, alt. about 2,000 m., *Archer* 1320 (US). San Roque, vicinity of Medellín, *R. A. Toro* 1339 (NY). San Pedro, *Tomás* 179 (US). Near Las Palmas, road between Medellín and El Retiro, alt. about 2,500 m., *Hodge* 6701 (US).

Notes accompanying the type describe the plant as a tree 4 meters high, with pale greenish flowers, while *Archer* 1320 is said to be from a clambering plant about 1.5 meters high. *Tomás* 179 is said to have white flowers and black fruits.

Although at first glance the new species suggests *G. pubescens* Fedtsch. & Basil., also of western Colombia, it is readily distinguished by its short-campanulate corolla; *G. pubescens* has a cylindric-urceolate corolla which is about 7 mm. long and sparsely puberulent at anthesis. The pedicels of *G. pubescens* are hispidulous with slender eglandular hairs about 1 mm. long and also copiously white-puberulent, its filaments are about 3 mm. long and conspicuouly pilose, its anthers about 2 mm. long, and its ovary copiously pilose. *Gaultheria secunda* Remy, of Bolivia and southern Peru, has leaves very similar to those of the new species, but its branchlets and pedicels are white-puberulent as well as strigose with stiff hairs. The southern species has longer filaments than those of the new species, its anthers are very inconspicuously awned, and its ovary is copiously puberulent. On the basis of corolla-characters, *G. secunda* is apparently the closest ally of *G. elassantha*.

Gaultheria amoena A. C. Sm. sp. nov.

Frutex nanus habitu prostrato, foliis parvis, floribus solitariis, pedicellorum bracteolis conspicuis, calycis lobis elongatis distinguitur; *G. barosmoidi* Rusby boliviensi affinis, floribus et habitu subsimilis, ramulis pedicellisque glabris vel puberulis non strigoso-hispidulis, pedicellorum bracteolis majoribus peristentibus differt.

Low shrub, often repent, freely branching, the branchlets slender, when young reddish or brownish and white-puberulent, at length glabrescent and grayish, the younger parts sometimes bearing internodal bracteoles like those of the pedicel described below; petioles slender, shallowly canaliculate, 1–3 mm. long, essentially glabrous; leaf-blades

subcoriaceous, greenish brown when dried, elliptic, (1–) 1.5–2.5 cm. long, 0.8–1.5 cm. broad, broadly obtuse or subrounded at base, obtusely callose-apiculate at apex, slightly recurved and serrulate at margin (teeth 4–6 per centimeter, glandular-mucronulate), glabrous on both sides, pinnate-veined, the costa prominulous above, elevated beneath, the secondary nerves 2–4 per side, curved-ascending, elevated on both surfaces, the veinlet reticulation coarse, often prominulous on both surfaces; inflorescence axillary, 1-flowered, the pedicel (doubtless partially peduncular in origin) slender, 5–12 mm. long at anthesis, sparsely puberulent, soon glabrescent, bearing several alternate bracteoles (bracts?), these papyraceous, ovate-lanceolate, obtuse, 3–6 mm. long, about 2 mm. broad, faintly ciliolate-margined; calyx submembranaceous, deeply 5-lobed, the lobes spreading, elongate-deltoid, about 5 mm. long and 2.5 mm. broad, acute, obviously nerved, faintly puberulent distally within, otherwise glabrous; corolla submembranaceous when dried, glabrous, urceolate, 7–8 mm. long, about 4 mm. in diameter, contracted at throat, the lobes 5, oblong, obtuse, about 1 mm. long; stamens 4–4.5 mm. long, glabrous, the filaments slender, ligulate, 3–3.5 mm. long, the anthers about 1.3 mm. long including the awns, these minute, about 0.2 mm. long; ovary depressed-subglobose, glabrous, the style about 5 mm. long, the stigma minutely capitate; fruit carnose, subglobose, 8–10 mm. in diameter, many-seeded, the calyx-lobes persistent.

Type in the U. S. National Herbarium, No. 1951713, collected on páramo in the vicinity of Laguna de San Rafael, crest of the Central Cordillera north of Volcán Puracé, Department of Cauca, Colombia, alt. 3,350 meters, January 29, 1947, by J. Cuatrecasas (No. 23432). Duplicates in the herbaria of the Arnold Arboretum and the Chicago Natural History Museum.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Caldas: On dry grassy páramo, Cerro Tatamá, alt. 3,400–3,700 m., *Pennell* 10570 (NY). El Valle: Western slope of Central Cordillera, headwaters of Ríos Tuluá and Bugalagrande, Páramo de Las Vegas, alt. 3,600–3,800 m., *Cuatrecasas* 20294 (A, Ch). Cauca: Laguna de Guanacas, *Lehmann* K.183 (herb. Kew).[14]

The cited specimens are described as low or repent shrubs, sometimes growing on rocks. The only available flowering collection, designated as the type, has the calyx white or greenish white and the corolla rose. *Pennell* 10570 is said to have a red corolla, which I have not seen. The fruits are described as fleshy and white.

The new species is very distinctive and appears to have no close relatives in the northern Andes. It suggests the Bolivian *G. barosmoides* Rusby, differing as indicated in the above diagnosis.

[14] The cited Lehmann specimen is not available for study at the moment, but while working at Kew in 1931 I noted its precise similarity to *Pennell* 10570, like which it is also a fruiting specimen.

Gaultheria stereophylla A. C. Sm. nom. nov.

Gaultheria serrulata Danguy & Cherm. Bull. Mus. Hist. Nat. Paris 28: 435. 1922; non Herzog (1915).

ECUADOR: Azuay: Between Huagrarancha and Loma de Galápagos, alt. 3,140–3,505 m., a shrub 3–4 feet tall, *Steyermark* 53458 (A, Ch).

The cited material matches in all essential details the type of this well-marked species, the original name of which is unfortunately a later homonym.

Gaultheria oreogena A. C. Sm. sp. nov.

Frutex compactus foliorum laminis parvis rigidis subglabris, rete venularum obvio, floribus paucis saepe in axillis foliorum solitariis, calyce amplo, corolla glabra distinguitur; a *G. stereophylla* A. C. Sm. foliis majoribus, rete venularum prominentiore, bracteis bracteolisque majoribus, calycis lobis elongatis differt.

Shrub about 30 cm. tall, the branchlets terete, at first strigose with dark stiff eglandular hairs 2–3 mm. long, glabrescent and covered with smooth loose grayish bark; petioles stout, rugulose, 2–4 mm. long, sparsely and deciduously strigose; leaf-blades coriaceous, olivaceous when dried, elliptic-oblong, 2–3.5 cm. long, 0.7–1.7 cm. broad, rounded or broadly obtuse at base, obtusely callose-apiculate at apex, thickened, slightly recurved, and serrulate at margin (teeth 4–6 per centimeter, callose-mucronate or rigidly ciliate), glabrous on both sides or sparingly strigose along principal nerves beneath with hairs less than 1 mm. long, sometimes scattered-brown-punctate beneath, pinnatinerved, the costa and secondary nerves (3 or 4 per side, curved-ascending) slightly elevated above and conspicuously so beneath, the veinlet-reticulation coarse, nearly plane above, prominulous beneath; flowers sometimes solitary in axils of distal leaves, sometimes aggregated into subterminal or axillary 3–7-flowered racemes, the rachis up to 2.5 cm. long, with the pedicels at first hispidulous with slender (usually eglandular but sometimes gland-tipped) hairs 1-2 mm. long and also white-puberulent, the longer hairs caducous; flower-subtending bracts and pedicellary bracteoles papyraceous, elliptic-oblong, 4–9 mm. long, 3–4 mm. broad, scarious and puberulent at margin; pedicels variable in length, usually 10–15 mm. long at anthesis, bibracteolate below middle; calyx cupuliform, at anthesis 5–8 mm. long, deeply 5-lobed, the lobes elongate-deltoid, 4.5–7 mm. long, 2.5–4 mm. broad, acute, sparsely puberulent without; corolla urceolate, at anthesis about 9 mm. long and 6 mm. in diameter, glabrous, the lobes 5, deltoid-oblong, obtuse, about 1.5 mm. long; stamens 5–6 mm. long, the filaments slender, obscurely puberulent, 3.5–4 mm. long, the anthers 2–2.5 mm. including awns about 0.5 mm. long; ovary depressed-globose, about 3 mm. in diameter at anthesis, closely puberulent, the style stout, 4–6 mm. long, truncate at apex.

Type in the herbarium of the Arnold Arboretum, collected between La Torre and Alto del Buey, Los Farallones, crest of the Western Cordillera, Department of El Valle, Colombia, alt. 3,400–3,550 meters, August 10, 1946, by J. Cuatrecasas (No. 21898). Duplicate in the Chicago Natural History Museum.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: El Valle: Western Cordillera, Los Farallones, crest of the cordillera, in thickets on páramo of La Torre, alt. 3,750 m., *Cuatrecasas* 17845 (A, Ch).

The specimens are said to be from shrubs about 30 cm. high, with coriaceous leaves which are bright green above and yellowish green beneath; the pedicels, bracts, and calyx are red to purplish red; the urceolate corolla is red, crimson, or purplish.

The new species suggests the Ecuadorian *G. stereophylla* A. C. Sm. (*G. serrulata* Danguy & Cherm.), from which it differs as mentioned in the above diagnosis. *Gaultheria oreogena* shows unusual variations in its inflorescence, the flowers being either solitary or aggregated into short racemes. The stiff hairs of the rachis and pedicels are usually eglandular, but in some parts of the available material these hairs are obviously glandular. The size of the calyx also varies more than usual in the genus.

Gaultheria grata A. C. Sm. sp. nov.

Frutex *G. alnifoliae* (Dun.) A. C. Sm. venezuelensi affinis, forma et textura foliorum similis, indumento strigoso ramulorum foliorum inflorescentiarumque, floribus majoribus differt; *G. strigosae* Benth. colombiensi indumento subsimilis, foliorum forma valde differt.

Shrub, the branchlets slender, terete, brownish, strigose with stiff stramineous hairs about 2 mm. long and also obscurely pale-puberulent, at length glabrescent and cinereous; petioles rugulose, 3–6 mm. long, pubescent like the branchlets; leaf-blades coriaceous, brownish when dried, obovate, (3–) 4.5–5.5 cm. long, (1.5–) 2.5–3.2 cm. broad, attenuate at base and long-decurrent on the petiole, rounded or slightly emarginate and often obtusely callose-mucronate at apex, slightly recurved and serrulate at margin (teeth 7–9 per centimeter, callose- or bristle-tipped), faintly puberulent above when young, sparsely strigose-hispidulous beneath on principal nerves with hairs like those of the branchlets, at length glabrescent and scattered-brownish-punctate, pinnatinerved, the costa nearly plane above, prominent beneath, the secondary nerves 2–4 per side, ascending, prominulous above, sharply raised beneath, the veinlet-reticulation intricate, prominulous on both surfaces; inflorescences axillary toward apices of branchlets, racemose, 8–12-flowered, circumscribed at base by imbricate bracts, the largest (inner) ones similar to flower-subtending bracts; rachis slender, 3–4.5 cm. long, copiously hispidulous with slender stramineous eglandular hairs about 1 mm. long and also white-puberulent; flower-subtending bracts papyraceous, obovate-oblong,

5–7 mm. long, 2–3 mm. broad, obtuse, ciliolate with fine white hairs, otherwise glabrous; pedicels slender, 5–8 mm. long at anthesis, pubescent like the rachis, bibracteolate near base, the bracteoles obovate, about 2 mm. long, scariose-margined, glabrous; calyx about 4 mm. in apical diameter at anthesis, deeply 5-lobed, the lobes ovate-deltoid, about 2 mm. long and 1.5 mm. broad, acute, strigose without (hairs about 1 mm. long), puberulent within; corolla white, cylindric-urceolate, 7–8 mm. long, about 5 mm. in diameter, sparsely strigose without, the lobes 5, deltoid, subacute, about 1.5 mm. long and 2 mm. broad; stamens about 4.5 mm. long, the filaments about 3 mm. long, broadest near base, very slender distally, hispidulous without with very fine hairs about 1 mm. long, glabrous within, the anthers about 2 mm. long including the awns, these very slender, about 0.6 mm. long; ovary 2–2.5 mm. in diameter at anthesis, copiously strigose-puberulent, the style terete, 4.5–5 mm. long, glabrous, the stigma obscurely lobed.

Type in the U. S. National Herbarium, No. 1851304, collected between Miranda and the Alto de la Aurora, Quebrada del Sararito, valley of Río Margua, Sarare region, Department of Norte de Santander, Colombia, alt. 950–1,087 meters, November 23, 1941, by J. Cuatrecasas (No. 13404).

This attractive plant resembles *G. alnifolia* (Dun.) A. C. Sm. in foliage, but clearly differs in its strigose indument, which suggests that of *G. strigosa* Benth., a species probably not closely related.

Gaultheria tolimensis Wedd. Chlor. And. 2: 173. 1860.

ECUADOR: Santiago-Zamora: Between Loma de Galápagos and headwaters of Río Tintas, alt. 3,200–3,505 m., *Steyermark* 53496 (A, Ch). Trail between Pallas and El Pan, on páramo, alt. about 3,400 m., *Steyermark* 54339 (A, Ch).

The cited specimens agree well with the Colombian material of this species which I have cited,[15] except that its leaves are smaller than typical; however, the smallest leaves of such specimens as *Pennell* 10569 are essentially similar to those of the Steyermark material. The species is apparently new to Ecuador. The collector notes it as a shrub about 5 feet tall, with the leaf-blades gray-green or whitish below, the calyx dull red or rose-red, and the corolla red.

Gaultheria arachnoidea A. C. Sm. Bull. Torrey Club 60: 101. 1933.

COLOMBIA: Nariño: North of Yacuanquer, temperate zone, *M. de Garganta* 461 (Ch).

To my knowledge this species has been previously represented only by the type collection, *Jameson* 499, from Volcán de Pasto, Nariño. The newly collected material agrees precisely with the type.

Gaultheria ornata A. C. Sm. sp. nov.

Frutex *G. santanderensi* A. C. Sm. affinis, foliorum laminis pilis brevibus subpersistentibus copiose glanduloso-hispidulis, floribus par-

[15] Bull. Torrey Club 60: 101. 1933.

tibus exterioribus pilis glanduliferis persistentibus circiter 0.5 mm. longis copiose hispidulis non tomentosis, calyce profunde lobato lobis brevioribus, corolla paullo breviore, antheris brevioribus inconspicue aristatis differt.

Shrub, probably less than 1 m. tall, the branchlets terete, brownish, copiously hispidulous with gland-tipped hairs 0.5–1 mm. long and sometimes obscurely whitish-puberulent, eventually glabrescent; petioles subterete, 2–4 mm. long, pubescent like the branchlets; leaf-blades coriaceous, broadly ovate or ovate-oblong, 2–4 cm. long, 1.5–2.8 cm. broad, cordate or subcordate at base, subacute and callose-mucronate at apex, minutely serrulate at margins with crowded callose-tipped teeth, pinnatinerved, the costa slightly impressed above and elevated beneath, the secondary nerves 3 or 4 per side, ascending, less conspicuous than the costa, the veinlet-reticulation immersed above, often prominulous beneath, the young leaf-blades copiously glandular-hispidulous with hairs less than 1 mm. long, these persisting for a short time on lower surfaces and margins but the blades eventually glabrescent, brown-punctate beneath; inflorescences subterminal or axillary toward apices of branchlets, racemose, 8–12-flowered, circumscribed at base by several imbricate bracts similar to those subtending flowers; rachis slender, 3–5 cm. long at anthesis, very densely glandular-hispidulous with reddish brown hairs 0.5–1 mm. long and also closely pale-puberulent; flower-subtending bracts papyraceous, lanceolate-obovate, 8–16 mm. long, 3–5 mm. broad, copiously short-glandular-hispidulous dorsally and at margin, minutely puberulent within, eventually glabrescent, persistent; pedicels slender, 8–13 mm. long at anthesis, copiously glandular-hispidulous (hairs stramineous, about 0.5 mm. long) and puberulent like the rachis, bibracteolate near middle, the bracteoles lanceolate, 5–7 mm. long, 1–1.5 mm. broad, pubescent without like the pedicel; flowers on exterior surfaces very copiously hispidulous with yellowish gland-tipped hairs about 0.5 mm. long; calyx 5-lobed nearly to base, the lobes elongate-deltoid, acuminate, 3.5–4 mm. long, 2–3 mm. broad; corolla urceolate, at anthesis 7–8 mm. long and about 5 mm. in diameter, the lobes deltoid, obtuse, about 1 mm. long; stamens 5–6 mm. long, the filaments slender, 4–5 mm. long, narrowed distally, pale-hispidulous within, the anthers 2–2.5 mm. long including the awns, these minute, about 0.3 mm. long; ovary depressed-subglobose, at anthesis about 2.5 mm. in diameter, the style about 4 mm. long, truncate at apex.

Type in the U. S. National Herbarium, No. 1932305, collected on Páramo Negro, above Bailadores, State of Mérida, Venezuela, May 12, 1944, by V. Rudd (No. 525).

ADDITIONAL SPECIMENS EXAMINED:

VENEZUELA: Mérida: Dry exposed slopes, Páramo de la Negra, between Bailadores and La Grita, alt. 2,745–3,045 m., *Steyermark* 57093 (A, Ch).

Although the new species and *G. santanderensis* A. C. Sm., from adjacent Colombia, are very closely allied, differences in the pubescence seem of such a nature that the two entities are best separated. In the Colombian species the leaf-blades are soft-tomentose beneath, the hairs being long and tangled, while the floral hairs are much longer, finer, and obscurely (if at all) glandular. Steyermark's notes indicate the plant to have leaf-blades dark green above and silvery beneath, while the pedicels, calyx, and corolla are deep rose-red.

Gaultheria meridensis A. C. Sm. sp. nov.

Species a *G. santanderensi* A. C. Sm. foliorum laminis pilis circiter 1.5 mm. longis plerumque eglanduliferis subpersistenter strigoso-hispidulis non tomentosis, inflorescentia partibus exterioribus pilis circiter 1 mm. longis glanduloso-hispidula non tomentosa, corolla paullo breviore, filamentis antherisque brevioribus inconspicue aristatis recedit; a *G. ornata* A. C. Sm. supra descripta inflorescentiae pilis conspicue longioribus, foliorum laminarum pilis rigidis longioribus plerumque eglanduliferis utrinque longe persistentibus, calycis lobis longioribus, filamentis brevioribus differt.

Shrub, the branchlets terete, copiously hispidulous with gland-tipped hairs 1–1.5 mm. long and also obscurely pale-puberulent, at length glabrescent and cinereous; petioles 2–3 mm. long, pubescent like the branchlets; leaf-blades coriaceous, ovate, 2–3 cm. long 1.3–2 cm. broad, lightly cordate or rounded at base, callose-mucronate at apex, subentire or obscurely serrulate at the thickened margin, copiously hispidulous on both surfaces with stiff ascending hairs about 1.5 mm. long, these stout at base, tapering, usually gland-tipped when young but eventually sharp-pointed and at length deciduous except for the bases, the costa slightly impressed above and elevated beneath, the secondary nerves 2 or 3 per side, ascending, inconspicuous, the veinlets immersed on both sides; inflorescences axillary near apices of branchlets, racemose, 8–10-flowered, the basal bracts similar to the flower-subtending bracts, papyraceous, oblong or lanceolate-obovate, 8–12 mm. long, 2.5–4 mm. broad, minutely puberulent within, persistent; rachis slender, 3–5 cm. long at anthesis, with the pedicels, bracts, and bracteoles glandular-hispidulous and puberulent like the young branchlets; pedicels slender, 12–14 mm. long at anthesis, elongating to 16 mm. in young fruit, bibracteolate slightly above middle, the bracteoles lanceolate, 5–6 mm. long, about 1 mm. broad; flowers on exterior surfaces copiously hispidulous with subascending yellowish gland-tipped hairs about 1 mm. long; calyx deeply 5-lobed, the lobes lanceolate, acuminate, 5–6 mm. long, about 2 mm. broad; corolla cylindric-urceolate, at anthesis about 7 mm. long and 5 mm. in diameter, the lobes deltoid, obtuse, about 1 mm. long; stamens about 5 mm. long, the filaments slender, 3–3.5 mm. long, pale-hispidulous, the

anthers about 2 mm. long including the awns, these minute, about 0.3 mm. long; ovary about 3 mm. in diameter at anthesis, sparsely puberulent, the style stout, about 5 mm. long, truncate at apex.

Type in the U. S. National Herbarium, No. 1186618, collected on Páramo del Molino, State of Mérida, Venezuela, alt. 3,200 meters, January 19, 1922, by A. Jahn (No. 936).

Another specimen from the same locality, but at 2,600 meters altitude, is *Jahn* 955 (US).

In the type of pubescence of its branchlets and inflorescence parts, the new species agrees with *G. ornata* A. C. Sm. rather than *G. santanderensis* A. C. Sm., but the stiff hairs are conspicuously longer throughout. In foliar pubescence, *G. meridensis* differs from its two allies; its leaf-hairs are copious, stiff, ascending, subpersistent, tapering, and very early devoid of terminating glands. The three species form a coherent group, in general allied to the Colombian *G. vestita* Benth. and *G. setulosa* N. E. Br., of Mount Roraima. *Gaultheria cordifrons* Sleumer (*G. glandulifera* Fedtsch. & Basil.), also from Mérida, suggests *G. meridensis* and *G. ornata* in foliage but has glabrous flowers.

Gaultheria remyana A. C. Sm. nom. nov.

Gaultheria mucronata Remy, Ann. Sci. Nat. III. 8: 232. 1847; non Hook. & Arn. (1834), nec Phil. (1858).

PERU: Puno: Prov. Sandia, 2–6 km. from Oconeque, on trail, alt. 1,800–2,100 m., *Metcalf* 30568 (US). Prov. Sandia, near Pajonal, on trail, alt. 1,000–1,300 m., *Metcalf* 30625 (US).

BOLIVIA: La Paz: Vicinity of Sorata, *Mandon* 559 (US). Sirupaya, alt. 2,200 m., *Buchtien* 505 (US). Region of Coripata, alt. 1,700 m., *Buchtien* 8155 (US), 8156 (US). Tipuana Valley, alt. 1,600 m., *Buchtien* 7429 (US). Near Aten, *Williams* 1942 (US). Yungas, *Bang* 223 (US).

Remy's excellent species has been confused in herbaria with the Ecuadorian *G. tomentosa* H. B. K., with which it agrees in type of pubescence but from which it differs in its broad leaves and other obvious characters. Remy cites specimens of Pentland and d'Orbigny, from the Yungas region of Bolivia; the first is illustrated by photograph No. 38262 of the Chicago Natural History Museum series.

VACCINIACEAE [16]

Themistoclesia anfracta (A. C. Sm.) Sleumer, Notizbl. Bot. Gart. Berlin 13: 110. 1936.

COLOMBIA: El Valle: Los Farallones, crest of the Western Cordillera, thickets on páramo of La Torre, alt. about 3,750 m., *Cuatrecasas* 17857 (Ch).

The cited collection, apparently the second of the species, agrees in all respects with the type, from Mount Santa Ana in the Department

[16] In this treatment the genera are discussed in the sequence proposed by Sleumer, Bot. Jahrb. Engler 71: 386–389. 1941.

of Cauca. Cuatrecasas indicates the plant as a small shrub with an orange-red corolla.

Themistoclesia cuatrecasasii A. C. Sm. sp. nov.

Frutex epiphyticus foliis conspicue distichis, petiolis brevissimis, floribus subsessilibus solitariis vel binis, calyce hispidulo, filamentis elongatis facile distinguitur; *T. anfractae* (A. C. Sm.) Sleumer affinis, foliis majoribus, pedicellis brevioribus, floribus paullo majoribus, staminium proportione differt.

Epiphytic shrub with pendulous branches, the branchlets slender, brownish, copiously hispidulous with reddish brown hairs about 0.5 mm. long, glabrescent; leaves apparently regularly distichous, the petioles inconspicuous, glabrous, 1–1.5 mm. long, the leaf-blades subcoriaceous, brownish when dried, ovate, (2–) 2.5–3.5 cm. long, (1–) 1.5–2 cm. broad, subcordate at base, short-cuspidate to a callose-acute apex, slightly recurved at margin, glabrous, inconspicuously brown-punctate beneath, obscurely 5-nerved from base, the costa and short secondary nerves immersed or plane on both surfaces; flowers axillary, solitary or paired, subsessile, the rachis essentially none, indicated only by several imbricate papyraceous glabrous ovate bracts less than 1 mm. long subtending the flowers; pedicels slender, subterete, about 1 mm. long, essentially glabrous, obscurely bibracteolate; calyx soft-carnose, at anthesis 4–5 mm. long and about 3 mm. in apical diameter, copiously hispidulous with reddish brown hairs about 0.3 mm. long, the tube obconical, gradually tapering into the pedicel, the limb suberect, about 1.5 mm. long, glabrous within, 5-dentate, the lobes broadly triangular, about 0.5 mm. long, apiculate, the sinuses rounded; corolla carnose, cylindric, at anthesis 11–12 mm. long and about 4 mm. in diameter, hispidulous on the lobes externally with stiff hairs about 0.7 mm. long, otherwise glabrous, the lobes 5, oblong, obtuse, 1–1.5 mm. long; stamens 10, shorter than the corolla, about 9 mm. long, the filaments ligulate, slender, about 6 mm. long, pale-hispidulous distally at margin, the anthers about 4 mm. long, the tubules slightly longer than the thecae, dehiscing by elongate clefts; style slender, terete, subequal to the corolla, slightly swollen at apex.

Type in the herbarium of the Arnold Arboretum, collected below El Diamante mine, Quebrada de Las Nieves, northwestern slope of Los Farallones, Western Cordillera, Department of El Valle, Colombia, alt. 2,900 meters, July 30, 1946, by J. Cuatrecasas (No. 21785). Duplicate in the Chicago Natural History Museum.

The collector's notes indicate the plant to be an epiphytic shrub with leafy pendulous branches; the leaves are thick, coriaceous, dark shining green above and bright green beneath; the calyx is rosy green and the corolla carmine.

Themistoclesia cuatrecasasii is at once distinguished by its solitary or paired subsessile flowers, and is further characterized by such details as the subsessile and regularly distichous leaves, hispidulous calyx, and elongate filaments. The last character suggests *T. dryanderae* Sleumer, but that species has differently shaped and obviously petiolate leaves, a racemose inflorescence, long pedicels, a glabrous calyx, and longer floral parts. A closer relative of the new species is doubtless *T. anfracta* (A. C. Sm.) Sleumer, from which it differs in several obvious characters as noted above.

Themistoclesia compta A. C. Sm. sp. nov.

Frutex ramulis dependentibus, partibus novellis, calyce, et corollae apice debiliter hispidulis, foliorum laminis lanceolatis, floribus solitariis, corolla cylindrico-urceolata facile distinguitur; a *T. anfracta* (A. C. Sm.) Sleumer habitu, foliorum forma, pedicellis longioribus, calyce majore, corollae forma valde differt.

Slender shrub with elongate drooping branches, the branchlets very slender, brownish, copiously but weakly hispidulous with pale hairs about 1 mm. long, glabrescent; petioles slender, rugulose, about 2 mm. long, pubescent like the young branchlets; leaf-blades coriaceous and brownish when dried, apparently fleshy when fresh, lanceolate, (2–) 2.5–3.5 cm. long, 0.7–1.2 cm. broad, obtuse at base, attenuate to a callose-apiculate apex, often sharply recurved at margins, pale-hispidulous on both surfaces when young, subpersistently so beneath and also sparsely brownish-glandular-punctate, inconspicuously 3-nerved from near base, the costa impressed above, slightly raised beneath, the secondary nerves short, often obscure, the veinlets immersed; flowers solitary, axillary, the pedicel slender, 5–7 mm. long at anthesis, hispidulous like the young branchlets, circumscribed at base by a few obscure bracts, bibracteolate near middle, the bracteoles minute, deltoid-oblong, less than 1 mm. long; calyx 6–7 mm. long and in apical diameter at anthesis, hispid with pale stiff hairs 0.5–0.8 mm. long, the tube sharply 5-angled, the limb submembranaceous, erect, 2.5–3 mm. long, with 5 minute apiculate teeth; corolla subcarnose, conical-urceolate, about 8 mm. long and 5 mm. in diameter at anthesis, hispid at apex like the calyx, otherwise glabrous, the lobes 5, deltoid, acute, about 1 mm. long; stamens 10, nearly as long as the corolla, glabrous, the filaments slender, ligulate, about 2.5 mm. long, the anthers about 6 mm. long, the thecae 2–2.5 mm. long, the tubules dehiscing by oval clefts about 2 mm. long; disk weakly hispidulous; style slender, nearly as long as the corolla, truncate at apex.

Type in the herbarium of the Arnold Arboretum, collected on páramo at the extreme north of the Alto del Buey, Los Farallones, crest of the Western Cordillera, Department of El Valle, Colombia, alt. 3,500–3,600 meters, October 11, 1944, by J. Cuatrecasas (No. 17928). Duplicate in the Chicago Natural History Museum.

The collector describes the plant as a small shrub with hanging branches, coriaceous grayish green leaves, and a bright red urceolate corolla.

Themistoclesia compta is readily distinguished, among described species, by its slender pendulous habit, lanceolate leaf-blades, hispidulous indument, solitary flowers, and cylindric-urceolate corollas. Although it is without immediate allies, it may be placed in Sleumer's key [17] in the vicinity of *T. anfracta* (A. C. Sm.) Sleumer, from which it differs in many obvious foliar and floral characters.

Sphyrospermum majus Griseb. Fl. Brit. W. Ind. 143. 1859.

Vaccinium valerii Standl. Field Mus. Bot. 18: 884. 1938.
Themistoclesia valerii Sleumer, Bot. Jahrb. Engler 71: 390. 1941.

Although the Costa Rican specimens included in the concept here reduced to synonymy do not strictly fall into the geographic area of the present paper, the identity of *Vaccinium valerii* with the widespread *S. majus* should be noted. The actual type specimen (*Standley & Valerio* 52483) bears only very immature and minute flowers, but another specimen from the type locality (*Standley & Valerio* 52343) has a mature corolla about 7 mm. long, as described by Standley. *Themistoclesia smithii* (Standl.) Sleumer, inferred by Sleumer [18] to be closely related to *T. valerii*, is correctly placed in *Themistoclesia*.

Sphyrospermum buxifolium Poepp. & Endl. Nov. Gen. & Sp. 1: 4. *pl.* 8. 1835.

Vaccinium pachycardium Standl. Field Mus. Bot. 18: 883. 1938.

The type specimen of *Vaccinium pachycardium* (*Standley & Torres* 51769, from Province of Cartago, Costa Rica), although lacking corollas, is quite similar to the numerous Costa Rican specimens referred without question to *S. buxifolium*.

Eleutherostemon Herzog, Meded. Rijks Herb. Leiden 27: 22. 1915.

Diogenesia Sleumer, Notizbl. Bot. Gart. Berlin 12: 121. 1934.

The genus *Diogenesia* Sleumer has indeed, as pointed out by Macbride,[19] been one of the most puzzling components of the Andean vacciniaceous complex. Proposed by Sleumer in 1934 on the basis of a single species, *D. octandra*, it was subsequently reduced by him in 1936 [20] to *Vaccinium*, under Sect. *Leptothamnia* Benth. & Hook. In his treatment of 1936, Sleumer grouped in this relationship four species of *Vaccinium: V. octandrum* (Sleumer) Sleumer, *V. incarum* Sleumer, *V. bolivianum* (Britton) Sleumer, and *V. thibaudioides* Sleu-

[17] Bot. Jahrb. Engler 71: 390–392. 1941.
[18] Bot. Jahrb. Engler 71: 392. 1941.
[19] Univ. Wyoming Publ. 11: 39, 40. 1944.
[20] Notizbl. Bot. Gart. Berlin 13: 136, 137. 1936.

mer. In 1941 [21] he again elevated the group to generic rank, to the above four species adding two more, *Diogenesia laxa* (A. C. Sm.) Sleumer and *D. amplectens* (Sleumer) Sleumer.

However, both Sleumer and I have completely overlooked the generic name *Eleutherostemon* Herzog, validly published in 1915 with an excellent description of its type species, *E. racemosum*, and furthermore accompanied by a new combination, *E. bolivianum*, based upon *Rusbya boliviana* Britton. Herzog allied his new genus to *Themistoclesia;* its identity with *Diogenesia* Sleumer is apparent upon perusal of the description, and I have verified this by examination of a photograph and fragments of the type, lent me from the Rijksherbarium at Leiden through the kindness of the director, Prof. H. J. Lam, and the curator, Dr. J. Th. Koster. Herzog's type species, *E. racemosum*, is conspecific with *Diogenesia thibaudioides* (Sleumer) Sleumer.

The fact that species of this group have been referred at times to no fewer than six genera (*Eleutherostemon*, *Diogenesia*, *Vaccinium*, *Thibaudia*, *Themistoclesia*, and *Rusbya*) gives point to Macbride's remarks (loc. cit.) that students of these species have appeared more than a little uncertain of their relationships. Macbride would prefer to regard *Diogenesia octandra* and its allies as a section of *Thibaudia* (apparently without a formal sectional name), connecting that genus with *Themistoclesia* and perhaps *Vaccinium*. Without attempting here to justify current generic lines in the Andean Vacciniaceae,[22] which are indeed rather tenuous, one may remark that *Eleutherostemon* (*Diogenesia*) is composed of a group of indubitably related species with recognizable and usable characters. Our uncertainties as to the alliance and circumscription of this group in the past may well have been due to the paucity of available material.

The significant characteristics of the species of *Eleutherostemon* are their slender, often epiphytic, habit, persistent and aristate stipules, nonarticulate calyces, small flowers and sometimes elongate filaments, and their subglobose, dry, easily shattered fruits. In my opinion, Sleumer in 1941 correctly placed the genus (as *Diogenesia*) as an ally of *Rusbya*, *Sphyrospermum*, and *Themistoclesia;* its relationship to *Vaccinium* and *Thibaudia* seems more remote. The genus is thus known to be composed of six species, reported from Bolivia, Peru, Ecuador, and Colombia; to these I now add two more species, from Colombia and Venezuela. Below are cited the synonymies of the known components of *Eleutherostemon*.

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[21] Bot. Jahrb. Engler 71: 395, 396. 1941.

[22] E. g., Sleumer, Bot. Jahrb. Engler 71: 386–408. 1941.

Eleutherostemon racemosum Herzog, Meded. Rijks Herb. Leiden 27: 22. 1915.
Vaccinium thibaudioides Sleumer, Notizbl. Bot. Gart. Berlin 12: 140. 1934.
Diogenesia thibaudioides Sleumer, Bot. Jahrb. Engler 71: 396. 1941.

Type: Locotal, Cochabamba, Bolivia, *Herzog* 2246 (Herb. Leiden; photograph US).

Range: Known only from the two type collections involved. The type of *Vaccinium thibaudioides* is *Steinbach* 9628 (Herb. Berlin, probably destroyed; duplicate US), from Incacorral, Cochabamba, Bolivia.

There can be no doubt of the specific identity of the two binomials concerned. The most careful comparison of inflorescences shows precise agreement in all details. The leaves also are similar in texture, shape, venation, etc.; those of Herzog's type are the larger (8–10 cm. long as contrasted with 4.5–6 cm. for Sleumer's type), but this slight difference is the only one apparent.

Eleutherostemon amplectens (Sleumer) A. C. Sm. comb. nov.
Thibaudia amplectens Sleumer, Notizbl. Bot. Gart. Berlin 12: 58. 1934.
Diogenesia amplectens Sleumer, Bot. Jahrb. Engler 71: 396. 1941.

Type: San Miguel (Province?), Ecuador, *Schimpff* 248 (Herb. Berlin, probably destroyed; fragment US).

Range: Known only from the type.

Eleutherostemon laxum (A. C. Sm.) A. C. Sm. comb. nov.
Thibaudia laxa A. C. Sm. Contr. U. S. Nat. Herb. 28: 424. 1932.
Vaccinium laxum A. C. Sm. & Camp, Brittonia 2: 264. 1936.
Diogenesia laxa Sleumer, Bot. Jahrb. Engler 71: 396. 1941.

Type: Putis, Choimacota Valley, Ayacucho, Peru, *Weberbauer* 7532 (Ch).

Range: Known only from the type and *Pearce* (Kew), from "Cuitoc," presumably also in Peru.

Eleutherostemon caudatum (Sleumer) A. C. Sm. comb. nov.
Themistoclesia caudata Sleumer, Notizbl. Bot. Gart. Berlin 12: 134. 1934.
Vaccinium incarum Sleumer, Notizbl. Bot. Gart. Berlin 13: 137. 1936.
Diogenesia caudata Sleumer, Bot. Jahrb. Engler 71: 396. 1941.

Type: Between Quellacocha and Puytac, Ayacucho, Peru, *Raimondi* 9873 (Herb. Berlin, probably destroyed; fragment US).

Range: Known only from the type.

Eleutherostemon bolivianum (Britton) Herzog, Meded. Rijks Herb. Leiden 27: 23. 1915.
Rusbya boliviana Britton, Mem. Torrey Club 4: 215. 1895.
Vaccinium bolivianum Sleumer, Notizbl. Bot. Gart. Berlin 13: 137. 1936.
Diogenesia boliviana Sleumer, Bot. Jahrb. Engler 71: 396. 1941.

Type: Songo, Bolivia, *Bang* 852 (NY; duplicates US and other herbaria).

Range: Known only from the type collection.

Eleutherostemon octandrum (Sleumer) A. C. Sm. comb. nov.
Thibaudia acuminata Don ex Griseb.; Benth. & Hook. Gen. Pl. 2: 575. 1876, nomen, non Hook. (1837).
Diogenesia octandra Sleumer, Notizbl. Bot. Gart. Berlin 12: 121. 1934.
Vaccinium octandrum Sleumer, Notizbl. Bot. Gart. Berlin 13: 136. 1936.
Thibaudia octandra Macbr. Univ. Wyoming Publ. 11: 40. 1944.

Type: Tatanera, Prov. Carabaya, Puno, Peru, *Lechler* 2614 (Herb. Berlin, probably destroyed; dupl. Herb. Genève; photograph and fragment US).

Range: In addition to the type, Sleumer has subsequently listed specimens from Cerro de Cusilluyoc, Cuzco, Peru (*Pennell* 14098a, US), from Tungurahua, Ecuador (*Sydow* 549, 587), and from Cauca, Colombia (*von Sneidern* 1003). I have not been able to verify the identity of the Ecuadorian and Colombian collections with this species.

Eleutherostemon andinum A. C. Sm. sp. nov.

Frutex divaricatus foliorum laminis conspicue nervatis et basi obtusis, inflorescentia multiflora bracteis numerosis persistentibus subtenta, calyce basi truncato, corolla brevi urceolata, filamentis puberulis, antherarum tubulis per poros elongatos dehiscentibus, ovarii disco conspicue elevato distinguitur; *E. octandro* (Sleumer) A. C. Sm. forsan affinis, foliorum forma nervisque, inflorescentia breviore, floribus minoribus, staminibus 10 valde differt.

Robust shrub, the branches spreading, distally dependent, striate, cinereous, the young branchlets terete, brownish, pale-puberulent, soon glabrescent; stipules conspicuous, 4–5 mm. long, aristate from a swollen base, puberulent when young, subpersistent; petioles semiterete, 3–5 mm. long, puberulent like the branchlets; leaf-blades subcoriaceous, ovate-oblong, (4–) 5–9.5 cm. long, 2–4.5 cm. broad, obtuse at base and shortly decurrent on the petiole, acuminate at apex (acumen 0.5–1 cm. long, obtusely callose-tipped), entire and slightly recurved at margin, sparsely glandular-pilose on both sides when young with stiff reddish hairs about 0.3 mm. long and sometimes sparsely puberulent-hispidulous on the nerves, soon glabrescent, 5-nerved from near the base, the principal nerves conspicuously impressed above and raised beneath, the veinlet-reticulation immersed or slightly raised on both surfaces; inflorescences axillary or arising from defoliate branchlets, congested, subfasciculate, 8–16-flowered, subtended by numerous imbricate persistent bracts, these papyraceous, lanceolate, 3-5 mm. long, long-acuminate; pedicels slender, terete, 8–15 mm. long, continuous with the calyx, subpersistently pale-puberulent, bibracteolate near base, the bracteoles oblong-lanceolate, acute, about 1.5 mm. long; calyx-tube depressed-subglobose, truncate at base, faintly 5-angled, about 1.5 mm. long and 3 mm. in diameter, sparsely and minutely reddish-glandular-hispidulous, the limb erect, about 1.5 mm. long, 5-dentate, the teeth broadly triangular, apiculate, the sinuses rounded; corolla thin-carnose, glabrous (or with a few minute appressed pale hairs), urceolate, about 4 mm. long and 2.5 mm. in diameter at anthesis, conspicuously contracted at base and apex, the lobes 5, deltoid, acute, about 0.5 mm. long; stamens 10, similar, shorter than the corolla; filaments free, ligulate, 1.5–1.8 mm. long, copiously puberulent on both surfaces; anthers about as long as the filaments, erect, the thecae smooth, the tubules broad, slightly longer than the thecae, dehiscing by

introrse oval clefts for nearly their entire length; upper surface of ovary surmounted by a subcarnose short-cylindric disk about 0.5 mm. high closely surrounding the style, this stout, subterete, nearly as long as the corolla, the stigma inconspicuous, peltate; fruit subglobose, 4–5 mm. in diameter, the pericarp thin, easily shattering, the short calyx-limb and disk subpersistent.

Type in the herbarium of the Arnold Arboretum, collected in woods at Almorzadero, western slope of Los Farallones, Western Cordillera, Department of El Valle, Colombia, alt. 2,950 meters, July 25, 1946, by J. Cuatrecasas (No. 21706). Duplicate in the Chicago Natural History Museum.

The collector describes the plant as a very robust shrub with spreading branches which are pendulous at the apices; the leaves are coriaceous, dark green above and bright green beneath; the calyx is green and the corolla greenish white.

Although the stipules, fruits, and other characters of this plant point to its place in *Eleutherostemon*, it is, as mentioned in the above diagnosis, very distinct from the known species. The genus (as *Diogenesia*) has otherwise been mentioned from Colombia only on the basis of a single collection which Sleumer referred to *Diogenesia octandra*.

Eleutherostemon tetrandrum A. C. Sm. sp. nov.

Frutex vel arbor ab omnibus speciebus generis stipulis brevioribus, staminibus 4, filamentis longis, disco conspicuiore facile distinguitur; *E. octandro* (Sleumer) A. C. Sm. primo aspectu similis, characteribus supra enumeratis valde differt.

Tree or shrub, or shrubby epiphyte; branchlets slender, subterete, cinereous, glabrous; stipules comparatively inconspicuous, 1–2 mm. long, pulvinate at base, apiculate; petioles semiterete, glabrous, 2–5 mm. long; leaf-blades coriaceous, ovate- or elliptic- or lanceolate-oblong, 4–7.5 cm. long, 1.5–3.5 cm. broad, obtuse or acute at base and decurrent on the petiole, acuminate at apex (acumen 0.5–1 cm. long, the actual apex blunt), entire at margin, sometimes obscurely and sparsely glandular-pilose on both sides with dark hairs about 0.2 mm. long, 5–7-nerved from near base, the nerves ascending, impressed above, faintly elevated beneath, the innermost pair sometimes concurrent with the costa for 1.5 cm., the outermost pair often obscure, the veinlets immersed; inflorescences axillary or arising from branchlets below leaves, borne singly or occasionally in pairs, subtended by a few imbricate papyraceous deltoid bracts about 1 mm. long, racemose, 5–15-flowered, the rachis (5–15 or rarely to 25 mm. long) and pedicels very slender, minutely pale-puberulent; pedicels 7–10 mm. long at anthesis, continuous with the calyx, bibracteolate slightly below the middle, the bracteoles lanceolate, about 1 mm. long; calyx-tube subglobose-urceolate or obovoid, at anthesis 1.2–1.5 mm. in diameter, glabrous, the limb subspreading, less than 1 mm. long, 4-dentate, the

teeth broadly triangular, apiculate, the sinuses flattened; corolla thin-carnose, cylindric, 6–7 mm. long at anthesis, 1–1.5 mm. in diameter proximally and slightly broader toward apex, glabrous without, obscurely puberulent within, the lobes 4, deltoid, subacute, about 0.5 mm. long; stamens 4, alternate with the corolla-lobes, nearly as long as the corolla; filaments free, submembranaceous, ligulate, about 5 mm. long, densely and minutely puberulent within, glabrous without; anthers erect, about 2 mm. long, the thecae smooth, the tubules about as long as the thecae, broadly conical, dehiscing by introrse pores for nearly their entire length; upper surface of ovary surmounted by a conspicuous cylindric carnose glabrous disk 0.6–0.8 mm. high closely surrounding the style, this slender, terete, eventually longer than the corolla (8–12 mm. long), truncate at apex; young fruit subglobose, 3–4 mm. in diameter, surmounted by the persistent calyx-limb and disk.

Type in the herbarium of the Chicago Natural History Museum, No. 1256443, collected along Quebrada del Sararito, Sarare region, Department of Norte de Santander, Colombia, alt. 1,930–1,950 meters, October 22, 1941, by J. Cuatrecasas, R. E. Schultes, and E. Smith (No. 12574).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Norte de Santander: Sarare region, between Alto del Loro and Alto de Santa Inés, in woods, alt. 1,800–2,200 m., *Cuatrecasas, Schultes, & E. Smith* 12553 (Ch). Páramo de Fontibón, alt. 2,600–2,750 m., *Cuatrecasas, Schultes, & E. Smith* 12324 (Ch, US). Páramo de Tamá, toward Samaria, alt. 2,600–2,900 m., *Cuatrecasas, Schultes, & E. Smith* 12749 (Ch).

VENEZUELA: Mérida: Moist rich forest, Quebrada de Los Salichales, tributary of Río Canaguá, southwest of Canaguá, alt. 1,950–2,135 m., *Steyermark* 56420 (A, Ch).

The Colombian collections are all in flower and are described as shrubs or trees, with white corollas. Steyermark's specimen is mentioned as a shrubby epiphyte, with a pale green (apparently immature) fruit. These collections extend the known range of *Eleutherostemon* into the Eastern Cordillera of Colombia and into Venezuela. Although there are slight variations among them, their specific identity seems unquestionable. The short, pulvinate, apiculate stipules and shape and texture of the leaves are similar on all the specimens. All examined flowers are essentially identical, those of No. 12324 being immature and consequently somewhat smaller than stated in my description.

Eleutherostemon tetrandrum is remarkable in the genus for the reduction of the number of stamens and the long filaments. The disk is more prominent than noted in the other species, although it is in general similar to that described above for *E. andinum*. In general appearance and leaf shape, the new species most closely approximates *E. octandrum* (Sleumer) A. C. Sm., but floral differences are obvious.

Disterigma cryptocalyx A. C. Sm. sp. nov.

Frutex *D. alaternoidi* (H. B. K.) Nied. affinis, ramulis juvenilibus longe pilosis, foliorum laminis acute cuspidatis, floribus solitariis ses-

silibus bracteis 8–10 circumdatis, bracteis intimis magnis calycem involventibus, corolla majore, staminibus longioribus differt.

Branching shrub, sometimes epiphytic and scandent, the branchlets sometimes rooting at nodes; branchlets slender, when young obtusely angled, brownish, and stramineous- or pale ferruginous-pilose (hairs 1.5–2 mm. long, often forming a tangled indument), soon glabrescent and cinereous; petioles subterete, 1–2 mm. long, pale-hispidulous, glabrescent; leaf-blades subcoriaceous, dark green above and brownish beneath when dried, ovate, 15–25 mm. long, 8–12 mm. broad, rounded or broadly obtuse at base, sharply cuspidate at apex, entire at margin, essentially glabrous or with a few scattered glandular reddish hairs beneath, obscurely 3- or 5-nerved from base, the costa faintly impressed above and elevated beneath, the secondary nerves inconspicuous, the veinlets immersed; flowers solitary in leaf-axils, essentially sessile, circumscribed by 8–10 bracts, these papyraceous, broadly ovate or elliptic, glabrous, entire and scariose-margined, rounded at apex, the outer ones minute, the inner ones progressively larger, the 2 innermost 6–7 mm. long and broad, enveloping and completely concealing the calyx, often splitting longitudinally; calyx about 4 mm. long and in apical diameter at anthesis, the tube obtusely 4-angled, glandular-pilose with scattered minute appressed reddish hairs, the limb 2–2.5 mm. long including lobes, these 4, deltoid, subacute, 1–2 mm. long, 2–2.5 mm. broad, glabrous or sparsely setose distally; disk conspicuously annular-pulvinate, glabrous; corolla thin-carnose, glandular-pilose without like the calyx-tube, sparsely white-pilose within, subcylindric, 10–11.5 mm. long and about 5 mm. in diameter at anthesis, the lobes 4, reflexed at anthesis, deltoid, obtuse, about 1.5 mm. long; stamens 8, shorter than corolla, the filaments distinct, ligulate, 4–5 mm. long, copiously villose on both sides with pale hairs about 1 mm. long, the anthers 5–6 mm. long, the tubules slightly exceeding the thecae in length; style stout, terete, exserted at anthesis.

Type in the U. S. National Herbarium, No. 1795396, collected between Gabinete and Andalucia, western slope of Eastern Cordillera, Department of Huila, Colombia, alt. 2,200–2,300 meters, March 25, 1940, by J. Cuatrecasas (No. 8675).

ADDITIONAL SPECIMEN SEEN:

COLOMBIA: Huila-Caquetá boundary: Eastern Cordillera on the dividing crest, at Gabinete, alt. 2,300–2,450 m., *Cuatrecasas* 8419 (US).

The most obvious difference between this new species and *D. alaternoides* (H. B. K.) Nied. lies in the inflorescence bracts; the pedicels of *D. alaternoides*, although sometimes very short, are usually apparent, with an apical pair of bracteoles (rarely exceeding 4 mm. in length) which are shorter than the calyx and do not completely conceal it. The leaf-apex of *D. alaternoides* is obtuse or at most subacute, while the hairs of the young branchlets are cinereous and comparatively incon-

spicuous, usually less than 0.5 mm. long. The flowers of *D. alaternoides* are usually not solitary, and dimensions of the corolla and stamens are appreciably less than those of *D. cryptocalyx*. In leaf shape the new species suggests *D. acuminatum* (H. B. K.) Nied., from which it differs in obvious dimensions of leaves and flowers as well as in its much larger floral bracts.

Two sterile specimens which probably also represent the new species are:

COLOMBIA: **Boyacá**: Region of Mount Chapon, alt. about 2,270 m., *Lawrance* 103 (NY, US). **Antioquia**: Páramo de Sonsón, alt. 2,700–2,850 m., *Daniel* 3435 (US).

In the absence of flowers these specimens cannot be definitely assigned to *D. cryptocalyx*, but they have similar pubescence and leaf-apices, while their bud scales are very numerous and large (up to 12 mm. long), in texture suggesting the inflorescence bracts described above.

Disterigma popenoei Blake, Proc. Biol. Soc. Washington **35**: 120. 1922.

ECUADOR: **Loja**: Western slopes of Cordillera de Condor and northwest slopes of Nudo de Sabanillas, around Tambo Cachiyacu, along Río Cachiyacu, about 2 leagues southeast of Yangana, alt. 2,000–3,000 m., *Steyermark* 54801 (A, Ch).

This is only the third collection of the species which has come to my attention; the other two are also from the Province of Loja. The Steyermark collection is described as from a shrub less than 1 meter tall, with spreading branches; the leaves have 3 prominent sulcate nerves above; the corolla is white, with reflexed lobes; the anthers are tawny-brown; and the fruit is fleshy and white.

Disterigma elassanthum Blake, Journ. Washington Acad. Sci. **16**: 362. 1926.

COLOMBIA: Santander: Vicinity of **Las Vegas**, alt. 2,600–3,000 m., *Killip & Smith* 15947 (US); vicinity of Bucaramanga, alt. about 1,500 m., *F. A. Barkley & J. Araque M.* 18S114 (US).

In my revision of *Disterigma* I cited only the type collection for *D. elassanthum*,[23] but the above-cited Santander specimens agree precisely with the type, from Huila.

Killipiella stereophylla A. C. Sm. sp. nov.

Frutex a *K. styphelioide* A. C. Sm. ramulis puberulis haud tomentellis, foliorum laminis latioribus inconspicue nervosis, corolla leviter fissa, antheris basi rotundatis, tubulis levibus non tuberculatis, ovulis numerosis differt; a speciebus *Disterigmatis* inflorescentia uniflora conspicue multibracteata, calycis lobis magnis erectis, antherarum tubulis gracilibus distinguitur.

Shrub (epiphytic?) with slender elongate branches, these terete, cinereous, glabrous, when young brownish, obtusely angled, and minutely pale-puberulent; petioles semiterete, 2–3 mm. long, soon

[23] Brittonia **1**: 230. 1933.

glabrescent; leaf-blades coriaceous, stiff, glabrous, brownish when dried, narrowly oblong-elliptic, (15–) 20–32 mm. long, 7–12 mm. broad, truncate or broadly obtuse at base, acute or callose-apiculate at apex, entire at margin, the principal nerves 3, ascending from base, the costa faintly impressed above and raised beneath, the other nerves and veinlets immersed; inflorescence axillary, 1-flowered, the rachis very short, bearing 6–8 crowded bracts, these papyraceous, oblong-elliptic, striate with close parallel nerves, often split distally, minutely ciliolate at the scariose margin, the outer ones minute, the 2 innermost about 5 mm. long and broad, shorter than the calyx; flower terminal, the pedicel (above innermost bracts) very short or essentially none, up to 1 mm. long; calyx 7.5–8 mm. long, glabrous or obscurely puberulent when young, the tube cupuliform, about 2 mm. long and 2.5 mm. in diameter, the limb erect, papyraceous, cleft nearly to base, the lobes 4, narrowly imbricate, obovate-elliptic, about 5 mm. long, 2.5–3 mm. broad, callose-subacute at apex, similar to bracts in margin and venation; disk annular-pulvinate, glabrous; corolla thin-carnose, cylindric, about 10 mm. long and 4 mm. in diameter, the lobes 4, reflexed at anthesis, deltoid, subacute, about 1 mm. long; stamens 8, nearly as long as corolla, the filaments distinct, ligulate, about 4 mm. long, copiously short-pilose within, the anthers about 5 mm. long, the thecae rounded at base, about 2 mm. long, the tubules very slender, essentially smooth; style slender, subequal to corolla; ovules numerous, small, flattened.

Type in the herbarium of the Chicago Natural History Museum, No. 1296124, collected at Ricaurte, western slope of Western Cordillera, Department of Nariño, Colombia, alt. 1,300 meters, April 18, 1941, by K. von Sneidern (No. 612).

In general aspect and type of inflorescence this plant agrees with the recently described monotypic genus *Killipiella*,[24] like which it also has a very deeply cleft calyx-limb and slender anther-tubules. However, it disagrees with *K. styphelioides* and agrees with the genus *Disterigma* in having is corolla shallowly cleft, its anthers not appendaged at base and with smooth rather than tuberculate tubules, and its ovules comparatively numerous. The discovery of this new species demonstrates a stronger connection between *Disterigma* and *Killipiella* than was realized on the basis of the original species. Furthermore, the new species *Disterigma cryptocalyx*, described above, has floral bracts very similar to those of *Killipiella*.

Vaccinium cardonae A. C. Sm. sp. nov.

Frutex foliorum laminis elongato-ellipticis margine crenulatis et inflorescentiis copiose pilosis distinguitur; *V. puberulo* Kl. affinis,

[24] Journ. Washington Acad. Sci. **33**: 242–244. *fig. 1.* 1943.

laminis longioribus et pro longitudine angustioribus, calycis lobis elongato-deltoideis acuminatis differt.

Small tree, to 3 m. high, the branchlets terete, copiously pilose with spreading whitish hairs about 0.5 mm. long, presumably glabrescent; petioles semiterete, 2–3 mm. long, pilose like the branchlets; leaf-blades subcoriaceous, sparsely puberulent along the costa on both sides when young, glabrescent, lanceolate or narrowly elliptic, 3–5.5 cm. long, (0.8–) 1–1.8 cm. broad, attenuate at base and decurrent on the petiole, obtuse and obscurely callose-apiculate at apex, slightly recurved and obviously apiculate-crenulate at margin, the teeth 3–5 per centimeter, tipped distally with short and eventually caducous glands, the costa slightly impressed above, raised beneath, the lateral nerves 5–7 per side, short, subspreading, inconspicuously raised on both surfaces, the veinlet-reticulation obscure; inflorescences axillary toward apices of branchlets, essentially racemose or very narrowly paniculate and apparently sometimes leaf-bearing distally, the rachis, bracts, bracteoles, and pedicels copiously spreading-pilose like the branchlets; flower-subtending bracts lanceolate, 5–10 mm. long, sometimes leaflike; pedicels slender, at anthesis 5–8 mm. long, proximally bibracteolate with subulate bracteoles about 2 mm. long; calyx-tube copiously pilose, the limb suberect, about 2.5 mm. long, the lobes elongate-deltoid, about 2 mm. long, acuminate, dorsally puberulent, glabrous within; corolla white, thin-carnose, urceolate, about 4 mm. long, 5- or 6-angled, sparsely puberulent proximally, glabrous distally, the lobes minute, deltoid; stamens 10–12, about 2 mm. long, the filaments slender, spreading-white-pilose, the anthers about 1 mm. long, the thecae finely rugulose, the tubules subequal to the thecae, dehiscing by oblique oval pores; ovary sparsely puberulent on the distal surface, the style glabrous, subequal to the corolla.

Type in the U. S. National Herbarium, No. 1932221, collected on Cerro Acopán, Río Caroni, State of Bolívar, Venezuela, alt. 2,100 meters, in October 1947, by F. Cardona (No. 2279).

Although the new species clearly differs from typical specimens of *V. puberulum* Kl. as noted in the above diagnosis, a more extensive series of collections is desirable to show the variation in leaf form and calyx-lobes in this complex. Among the other species of southern Venezuela, the only one suggesting *V. cardonae* is *V. spathulatum* Camp & A. C. Sm., of Auyan-tepuí, which has entire leaf-blades and a glabrous short-lobed calyx.

Semiramisia speciosa (Benth.) Kl. Linnaea 24: 25. 1851.

ECUADOR: Santiago-Zamora: Along wooded slopes of Río Tintas, southeast of El Pan, alt. 2,895 m., *Steyermark* 53506 (A, Ch). Wooded slopes along Río Valladolid, between Quebrada Honda and Tambo Valladolid, alt. 2,000–3,000 m., *Steyermark* 54605 (Ch).

939630—50——4

Since mentioning [25] that this species was known only from the type collection, I have also seen a specimen from Carchi, *Mexia* 7603 (US). The Steyermark specimens are from suffrutescent epiphytes with pendent flowers; the corolla is deep red or orange-red distally and pale green proximally, and the anthers are golden; No. 53506 is locally known as "sarsilla."

Ceratostema charianthum A. C. Sm. sp. nov.

Frutex epiphyticus a speciebus generis adhuc cognitis corolla hypocrateriformi cum tubo cylindrico et lobis patentibus recedit; *C. alato* (Hoer.) Sleumer calycis forma subsimilis, foliis magnis integris, inflorescentia corolla staminibusque brevioribus valde differt.

Epiphytic shrub, glabrous throughout (except filaments), the branchlets very slender (1–1.5 mm. in diameter distally), pale brown; petioles rugulose, 3–5 mm. long, narrowly winged distally; leaf-blades subcoriaceous, brownish green when dried, elliptic-lanceolate, 7–11.5 cm. long, 2–4 cm. broad, acute at base and decurrent on the petiole, gradually tapering distally into a slender acumen 1–2 cm. long, entire and narrowly recurved at margin, pinnate-nerved, the costa slightly elevated or nearly plane above, prominent beneath, the secondary nerves 4–6 per side, spreading, curved and anastomosing toward margin, prominulous on both surfaces, the veinlet-reticulation immersed or faintly prominulous; inflorescences axillary, short-racemose, apparently 2- or 3-flowered, the rachis 5–7 mm. long, the flower-subtending bracts subulate, 2–3 mm. long; pedicels terete, rugulose, 14–18 mm. long at anthesis, articulate with calyx, bibracteolate near base, the bracteoles lanceolate-subulate, 1–2 mm. long, caducous; calyx at anthesis about 9 mm. long and 5 mm. in diameter distally, 5-winged for its entire length to the sinuses, the wings subcarnose, about 0.6 mm. broad, the tube about 6 mm. long, the limb erect, short, papyraceous, 5-lobed, the lobes conspicuously apiculate with a sharp acumen about 1 mm. long, the sinuses flattened; corolla thin-carnose, essentially hypocrateriform, about 30 mm. long, the tube cylindric, about 5 mm. in diameter, the limb flaring, deeply 5-lobed, the lobes deltoid-subulate, 8–9 mm. long, 7–8 mm. broad at base, abruptly narrowed, acute, the sinuses obtuse; stamens 10, nearly as long as corolla, alternately slightly unequal, the filaments free, membranaceous, ligulate, 4–5 mm. long, puberulent distally on both surfaces, the anthers 23–24 mm. long, the thecae coarsely granular, 7–8 mm. long, abruptly narrowed into the very slender tubules, these about twice as long as the thecae, dehiscing by flaring oval pores about 1 mm. long; style filiform, slightly exserted, the stigma minute.

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[25] Contr. U. S. Nat. Herb. 28: 349. 1932.

Type in the herbarium of the Chicago Natural History Museum, No. 1255153, collected in dense forest between Campanas and Arenillas, along Río Tintas, 10 leagues southeast of El Pan, Province of Santiago-Zamora, Ecuador, alt. 2,195 meters, July 13, 1943, by J. A. Steyermark (No. 53591).

The collector describes the plant as an epiphyte with subcoriaceous leaves which are deep green above and paler beneath; the corolla is deep red. Although at first glance the species described above does not suggest the genus *Ceratostema* (i. e., *Englerodoxa* of my treatment of 1932),[26] its essential characters point to this position. The species is indubitably new, and I believe that a slightly extended concept of *Ceratostema* will permit its inclusion there. Other species of *Ceratostema* have the corolla apophysate or at least greatly enlarged proximally, with lobes which are comparatively narrow and suberect at anthesis. The cylindric tube and flaring broad-lobed limb of the corolla of *C. charianthum* are therefore very noteworthy. In calycine characters the new species suggests *C. alatum* (Hoer.) Sleumer, but differences between the two species are numerous and obvious.

In connection with *C. charianthum* mention should be made of another Steyermark collection: ECUADOR: El Oro: Wooded slopes bordering Quebrada Nudillo and Quebrada Tambillo, tributary to Río Luis, and Piedra Grande, 2 leagues northeast of Curtincapa, alt. 1,615–1,890 m., *Steyermark* 53849 (A, Ch), a woody epiphyte hanging from branches, the calyx and pedicels green, the corolla deep red with recurved pale rose lobes, the filaments pale rose. In floral characters this specimen agrees very well with the type of *C. charianthum*, except that its calyx is apparently unwinged. Its leaves are somewhat larger and longer petiolate than those described above, with blades that are rounded at base and have fewer, more proximally oriented, ascending secondary nerves. I believe that No. 53849 represents a new species of this alliance, but more complete material is desired for description.

Ceratostema macranthum A. C. Sm. sp. nov.

Frutex ut videtur scandens vel epiphyticus, *C. calycino* (A. C. Sm.) Sleumer[27] et *C. alberti-smithii* (Sleumer) Sleumer affinis, petiolis

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[26] Contr. U. S. Nat. Herb. 28: 350–352. 1932. For corrections of the erroneous concept of *Ceratostema* there expressed, see Sleumer, Notizbl. Bot. Gart. Berlin 12: 278–282. 1935, and A. C. Smith, Bull. Torrey Club 63: 307–308. 1936.

[27] Although the binominal *Ceratostema calycinum* has been accredited to Bentham & Hooker by those who have had occasion to use it, including myself (Bull. Torrey Club 63: 307. 1936), I do not believe that this is the correct authorship. The species was first effectively published by me in 1932 (Contr. U. S. Nat. Herb. 28: 351), as *Englerodoxa calycina*, which I described as a new species with Bentham & Hooker as parenthetical authors. This was incorrect on my part, as the publication of the presumed basonym, *Ceratostema calycinum* Benth. & Hook. (Gen. Pl. 2: 570. 1876), was invalid, having been based merely on a refer-

longioribus, calyce coriaceo majore cum tubo 5-alato non cylindrico nec 10-costato, staminibus multo longioribus distinguendus; a priore foliorum laminis majoribus, rhachi pedicellis et corolla longioribus etiam differt; a posteriore ramulis et inflorescentiae partibus puberulis, foliorum laminis 5-nerviis recedit.

Liana or perhaps epiphytic shrub, the branchlets stout, inconspicuously angled, brownish to cinereous, closely pale-puberulent, becoming glabrescent; stipules intrapetiolar, connate, subulate from a pulvinate base, 4–5 mm. long; petioles rugulose, subterete or angled, (4–) 10–15 mm. long, glabrous or inconspicuously puberulent; leaf-blades coriaceous, brownish when dried, elliptic or ovate-elliptic, (5–) 7–12 cm. long, (2.5–) 3.5–6 cm. broad, acute or obtuse at base and shortly decurrent on the petiole, subacute at apex, entire and recurved at margin, essentially glabrous on both sides or sparsely puberulent beneath when young, 5-nerved from near base, the costa and the ascending secondary nerves impressed above, prominent beneath, the secondaries usually concurrent with the costa for about 1 cm., the veinlets immersed or faintly raised beneath; inflorescences axillary toward apices of branchlets, racemose, 3–12-flowered, the rachis and pedicels closely pale-puberulent, glabrescent after anthesis; rachis stout, striate and irregularly angled, (2–) 8–13 cm. long, the flower-subtending bracts caducous, not seen; pedicels stout, subterete, striate, 13–45 mm. long at anthesis, enlarged to about 3 mm. in diameter distally and obscurely articulate with the calyx, bibracteolate distally, the bracteoles caducous, not seen; calyx coriaceous, large, at anthesis 35–45 mm. long and 15–20 mm. in diameter distally, closely pale-puberulent including both surfaces of limb, at length glabrescent, the tube 8–10 mm. long and in apical diameter, 5-winged, the wings coriaceous, 2–3 mm. broad, narrowed at both ends, the limb suberect, deeply split into 5 lobes but these often partially and irregularly fused, the lobes usually 15–20 mm. long at anthesis, the sinuses acute; corolla thick-carnose, puberulent without, at length glabrescent, at anthesis 45–47 mm. long and 10–12 mm. in diameter proximally, slightly narrowed distally, deeply 5-lobed, the lobes lanceolate, acute, about 20 mm. long and 5 mm. in diameter at base, recurved at anthesis; stamens 10, about as long as the corolla, alternately slightly unequal, the filaments subcoriaceous, 7–12 mm. long, at first firmly coherent laterally, puberulent within, the anthers 40–42 mm. long, the thecae coarsely granular, 16–18 mm. long, rounded at base, the dorsal locules

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ence to the binomial *Anthopterus calycinus*, which was noted on one of Spruce's herbarium labels. Apparently the first reference of this species to *Ceratostema* after its valid publication in 1932 was by Sleumer (Notizbl. Bot. Gart. Berlin 12: 281. 1935). The correct binomial, therefore, appears to be *Ceratostema calycinum* (A. C. Sm.) Sleumer, dating from 1935.

conspicuously (1–3 mm.) longer than the ventral locules, the tubules stiff, longer than the thecae, dehiscing by flaring oblique oval pores about 1 mm. long; style comparatively stout, terete, about as long as corolla, truncate at apex.

Type in the herbarium of the Chicago Natural History Museum, No. 1255133, collected along trail between Pailas and El Pan, Province of Santiago-Zamora, Ecuador, alt. 2,255–3,445 meters, September 10, 1943, by J. A. Steyermark (No. 54311). Duplicate in the herbarium of the Arnold Arboretum.

ADDITIONAL SPECIMEN EXAMINED:

ECUADOR: Loja: Loja district, *André*, Oct. 1876 (US).

Steyermark's notes indicate the plant to be a liana with coriaceous leaves which are deep green above and paler beneath; the calyx-limb is dull red and shining, and the corolla is pale salmon, although noted also as dark red in other specimens seen at higher elevations but not collected. The André specimen is unaccompanied by notes. It disagrees slightly with the type in having its leaves somewhat smaller, its rachis shorter, and its inflorescence with more fugacious pubescence. However, the essential characters of the two collections are identical, and I place them together with confidence.

The new species is closely related only to *C. calycinum* (A. C. Sm.) Sleumer and *C. alberti-smithii* Sleumer, probably especially to the latter, but the characters mentioned in the above diagnosis amply differentiate it. *Ceratostema macranthum* is remarkable for its robust inflorescence and, even in *Ceratostema*, for its large coriaceous calyx.

Ceratostema silvicola A. C. Sm. sp. nov.

Frutex *C. amplexicauli* A. C. Sm. valde affinis, ramulis foliisque glabris, foliorum laminis majoribus cum nervis secundariis altius orientibus, pedicellis corolla staminibusque longioribus, calycis tubo tereti differt.

Shrub, the branchlets subterete, glabrous (probably puberulent when young); leaves sessile, amplexicaul, the petiole practically indiscernible, the blades subcoriaceous, when dried dark green above and brownish beneath, ovate-oblong, 9–13.5 cm. long, 5–7 cm. broad, conspicuously cordate at base with a sinus 1–1.5 cm. deep and rounded auricles, obtusely short-cuspidate at apex, entire and slightly recurved at margin, glabrous on both surfaces, pinnate-nerved, the costa slightly elevated above, very prominent beneath, the lateral nerves 5 or 6 per side, anastomosing toward margin, slightly impressed above, sharply raised beneath, the basal ones spreading, the distal ones curved-ascending, the veinlet-reticulation subimmersed; inflorescences axillary toward apices of branchlets, racemose, usually 5–7-flowered, the rachis, pedicels, and calyces soft-white-pilose; rachis slender, 1.5–3.5 cm. long, the flower-subtending bracts papyraceous, ovate, subacute,

about 2 mm. long, puberulent without; pedicels terete, 22–32 mm. long at anthesis, swollen distally and articulate with calyx, bibracteolate somewhat below the middle, the bracteoles similar to bracts but smaller; calyx-tube terete, about 3 mm. long and 4 mm. in diameter at anthesis, the limb papyraceous, spreading, 2–3 mm. long including lobes, these broadly deltoid, about 1.5 mm. long and 3.5 mm. broad, acute, the sinuses flattened or broadly obtuse; corolla crimson, carnose, subcylindric, 33–35 mm. long at anthesis and 10–12 mm. in diameter near base, narrowed distally, pilose without but less densely so than the calyx, deeply 5-lobed to near middle, the lobes subulate, acute, about 3 mm. broad at base; stamens 10, alternately slightly unequal, nearly as long as corolla, the filaments ligulate, glabrous, 6–8 mm. long, the anthers 26–28 mm. long, the thecae strongly granular, 10–11 mm. long, mucronulate at base, abruptly narrowed into very slender tubules, these nearly twice as long as the thecae, dehiscing by flaring oval pores about 1 mm. long; style filiform, subequal to corolla, the stigma minute.

Type in the U. S. National Herbarium, No. 1933897, collected among forest trees near Archidona, Canton Napo, Province of Napo-Pastaza, Ecuador, alt. 650 meters, April 20, 1935, by Ynes Mexia (No. 7283). Duplicate in the herbarium of the University of California.

The new species is closely related only to the recently described Colombian *C. amplexicaule* A. C. Smith, like which it has deeply cordate clasping leaves and a small calyx-limb, but from which it is distinguished by the several characters mentioned in the above diagnosis.

Periclesia pensilis A. C. Sm. sp. nov.

Frutex epiphyticus pendulus, a ceteris speciebus generis foliorum laminis late ovatis basi profunde cordatis, rhachi pedicellis et calyce glanduloso-pilosis, pedicellorum bracteolis magnis ovatis subapicalibus conspicue recedit; a *P. flexuosa* A. C. Sm. inflorescentia longiore, floribus 5-meris, calycis tubo majore, antherarum thecis longioribus distinguendus; a *P. lanceolata* (Benth.) A. C. Sm. calycis limbo majore, corolla filamentis antherarum tubulisque longioribus differt; a *P. reginaldii* Sleumer calycis tubo non alato et corolla pilosa etiam facile distinguitur.

Epiphytic shrub, dependent, the branchlets stout, subterete, brownish, puberulent or setulose-pilose when young, soon glabrescent; stipules intrapetiolar, forming an ovoid pulvinate subacute structure about 3 mm. long; petioles stout, inconspicuous, rugulose, 1–3 mm. long, pilose like the branchlets; leaf-blades subcoriaceous, brownish green when dried, ovate, 7–10.5 cm. long, 4–6 cm. broad, deeply cordate at base and probably subamplexicaul, abruptly narrowed distally into a sharp acumen 1–1.5 cm. long, slightly thickened at margin, glabrous on both sides or sparsely setulose on the costa beneath, pinnate-nerved,

the costa nearly plane above, prominent beneath, the lateral nerves about 3 per side, prominulous above and raised beneath, the lower ones spreading, the distal ones concurrent with the costa for 1–2 cm. and then ascending, the veinlet-reticulation prominulous on both surfaces or nearly plane; inflorescences axillary (rachis sometimes, but presumably rarely, branched), apparently 5–10-flowered, the rachis, pedicels, and calyx-tube copiously spreading-pilose with weak pale gland-tipped hairs about 1 mm. long, these interspersed with finer and sometimes shorter eglandular hairs; rachis faintly flexuose, up to 5 cm. long; flower-subtending bracts papyraceous, deltoid to ovate, 5–12 mm. long, glandular-pilose like the pedicels but more sparsely so and also finely puberulent; pedicels 10–18 mm. long at anthesis, conspicuously articulate with the calyx, bibracteolate just below the articulation, the bracteoles papyraceous, broadly ovate, up to 17 mm. long and 10 mm. broad, acuminate, conspicuously veined, pilose like the bracts; calyx large, about 3 cm. long and 2 cm. in apical diameter at anthesis, the tube cupuliform, about 5 mm. long and in diameter, the limb suberect, papyraceous or submembranaceous, conspicuously reticulate-nerved, pilose on both sides like the bracteoles, deeply 5-lobed, the lobes lanceolate, about 20 mm. long, 6–8 mm. broad, acute; corolla thin, cylindric, about 45 mm. long and 8 mm. in diameter near base, narrowed distally, puberulent without in the lower portion and glandular-pilose like the calyx-tube distally, glabrous within, deeply 5-lobed, the lobes lanceolate, about 10 mm. long; stamens 10, about as long as the corolla, the filaments membranaceous, glabrous, about 8 mm. long, connate in a tube except near apex, the anthers about 40 mm. long, the thecae conspicuously granular, 10–12 mm. long, mucronulate and incurved at base, the tubules nearly three times as long as the thecae, extremely slender, about 0.2 mm. in diameter distally, dehiscing by flaring subapical oval pores about 1 mm. long; disk glabrous, carnose, cupuliform; style filiform, about as long as corolla, the stigma minute.

Type in the herbarium of the Chicago Natural History Museum, No. 1255160, collected along Quebrada de Pampa de Los Cedros, tributary to Río Palma, northeast of San Pablo, Province of El Oro, Ecuador, alt. 2,285 meters, August 12, 1943, by J. A. Steyermark (No. 53798). Duplicate in the herbarium of the Arnold Arboretum.

From the three species which have thus far been referred to *Periclesia* the new species differs in the combination of striking characters mentioned in the above diagnosis. *Periclesia pensilis* has a remarkable habit, as indicated by the collector's field notes, which follow: "Epiphyte hanging from ropelike strands, which end in a globular hard head 6 inches in diameter, hanging from tree; leaves coriaceous; bracteoles and calyx rose-red; corolla pale rose with pale green lines, the lobes pale green within."

Periclesia nubigena A. C. Sm. sp. nov.

Frutex epiphyticus inter congeneros calycis limbo multo minore facile distinguendus; *P. reginaldii* Sleumer affinis, foliorum laminis brevioribus, calycis tubo tereti non alato, antherarum thecis brevioribus recedit.

Epiphytic shrub, the branchlets slender, terete, dark brown, copiously pilose with short pale hairs when young, glabrescent; petioles subterete, rugulose, 2–4 mm. long, essentially glabrous; leaf-blades subcoriaceous, dark green when dried, ovate-oblong, 3.5–5 cm. long, 1.5–3 cm. broad, obtuse at base, acute or short-acuminate at apex, slightly thickened and recurved at margin, short-white-pilose on both sides when young, glabrescent, obscurely pinnate-nerved, the costa impressed above, prominent beneath, the lateral nerves 4 or 5 per side, immersed above, inconspicuously prominulous beneath, the basal pair ascending from the petiole, the veinlets immersed; inflorescences axillary, apparently 5–7-flowered but the flowers readily caducous, the rachis slender, striate, pilose like the branchlets, 4–6 cm. long including the peduncle, this 2–3 cm. long and bearing a few evanescent ovate-deltoid bracts 2–3 mm. long; flower-subtending bracts early caducous, apparently small; pedicels terete, rugulose, 8–20 mm. long, soon glabrescent, enlarging distally and articulate with the pedicel, bibracteolate toward apex, the bracteoles papyraceous, lanceolate, 4–5 mm. long, sparsely puberulent and also margined with a few short gland-tipped hairs, caducous; calyx comparatively small, about 15 mm. long and 12 mm. in apical diameter at anthesis, faintly puberulent, the tube terete, about 5 mm. long and 3 mm. in diameter at anthesis, the limb subspreading, papyraceous, the lobes 5, ovate-deltoid, 5–6 mm. long, 4–5 mm. broad, narrowly acuminate, bearing a few marginal short-stalked glands, the sinuses subacute; corolla thin-carnose, cylindric, about 40 mm. long and 7 mm. in diameter near base, narrowed distally, glabrous except for a few inconspicuous short-stalked glands on the lobes, the lobes 5, lanceolate, about 15 mm. long, acute; stamens 10, subequal to the corolla, the filaments membranaceous, glabrous, firmly connate in a tube about 6 mm. long, the anthers about 38 mm. long, the thecae 8–9 mm. long, slightly narrowed at base, the tubules 3–4 times as long as the thecae, very slender, dehiscing by oblique oval pores about 1 mm. long; style filiform, about as long as corolla, the stigma minute.

Type in the herbarium of the Chicago Natural History Museum, No. 1255121, collected on moist dense cloud-forested slopes of Huagrarancha, 1½ leagues south of El Pan, Province of Azuay, Ecuador, alt. 3,140–3,350 meters, July 8,

1943, by J. A. Steyermark (No. 53403). Duplicate in the herbarium of the Arnold Arboretum.

The plant is described as a shrubby epiphyte 5 ft. tall, the leaves dark green above, pale beneath, the pedicel and calyx deep rose, the corolla bright red in the lower half and dull blood-red in the upper half. Although *P. nubigena* has a much smaller calyx-limb than any of the four species already placed in *Periclesia*, its essential characters are those of the genus. In texture of leaves, its elongate inflorescence, and texture of its calyx-limb, the new species is suggestive of *P. pensilis*, described above, but probably a closer relative is *P. reginaldii* Sleumer.

Macleania tropica A. C. Sm. Journ. Arn. Arb. 27: 91. 1946.

COLOMBIA: El Valle: Chocó region, Río Calima, right bank, on slopes opposite the Quebrada de la Brea, alt. 30–50 m., *Cuatrecasas* 21200 (A, Ch).

The second collection of this very distinct recently described species, from the same general region as the type, shows a few minor variations. The leaf-blades are sometimes up to 9 cm. long, the pedicels may be only 3–4 mm. long, and the calyx is somewhat smaller throughout than that of the type. On the whole, the available specimens are strikingly alike.

Macleania sleumeriana A. C. Sm. nom. nov.

Anthopterus ericae Sleumer, Notizbl. Bot. Gart. Berlin 12: 277. 1935. Not *Macleania ericae* Sleumer (1938).

ECUADOR: Pichincha: Cordillera Occidental, Saloya, between Kilometers 50 and 70 of the highway, alt. 1,800 m., *Acosta Solis* 10968 (Ch, US).

The cited specimen agrees very closely with Sleumer's original description, the species being typified by *Erica Heinrichs* 523c (presumably destroyed in the Berlin Herbarium). The type is said to have come from Cerro Tungurahua at about 4,000 meters, an altitude which seems too high for a member of this alliance.

Sleumer soon realized that his species represented *Macleania* rather than *Anthopterus*, and in 1938[28] he reduced it to the synonymy of *Macleania pentaptera* Hoer. without comment. Careful examination of the present specimen in connection with Sleumer's description causes me to disagree with this reduction, although the relationship is doubtless correct. However, *M. sleumeriana* has a large calyx with very broad, membranaceous, obviously nerved wings which are about 3 mm. broad and which project 3–4 mm. beyond the true calyx-lobes. The calyx-wings of *M. pentaptera* Hoer. are fleshy and not conspicu-

[28] Repert. Sp. Nov. Fedde 45: 16. 1938.

ously nerved, rarely if ever more than 1 mm. broad. In this character the specimens I have referred to *M. pentaptera*, especially those from coastal Colombia, are very variable, but I believe that *Anthopterus ericae* is too extreme in regard to its calyx to be included in a reasonable concept of Hoerold's species. Furthermore, Sleumer's species has the corolla soft-pilose or puberulent without, rather than glabrous as in *M. pentaptera.*

The nomenclature of the species of this alliance is somewhat confused by the existence of the name *Macleania ericae* Sleumer (*M. pentaptera* Sleumer, non Hoer.)[29] for a species related to *M. rotundifolia* Sod. & Hoer. Material of *M. ericae* is not available to me, but from the description it is quite different from *M. sleumeriana.*

Psammisia dolichopoda A. C. Sm. sp. nov.

Frutex interdum epiphyticus *P. breviflorae* (Benth.) Kl. et *P. pedunculatae* A. C. Sm. affinis sed foliorum laminis coriaceis, rhachi pedicellisque crassioribus, calyce sub anthesi multo majore recedit, a priore rhachi longiore et corolla latiore, a posteriore inflorescentiae pedunculo breviore et pedicellis corolla antherisque longioribus differt.

Shrub, sometimes epiphytic and scandent, glabrous throughout (except stamens), the branchlets subterete, brownish, with occasional internodal bracts, these papyraceous, lanceolate, 3–7 mm. long, inconspicuous; petioles stout, semiterete, rugulose, 6–10 mm. long; leaf-blades coriaceous, brownish when dried, lanceolate-oblong, (9–) 15–20 cm. long, 3.5–6.5 cm. broad, obtuse or subacute at base and decurrent on the petiole, gradually tapering to a sharp acumen 1–1.5 cm. long, slightly recurved at margin, 5-nerved, the costa narrowly impressed above and prominent beneath, the inner pair of lateral nerves ascending, concurrent with the costa for 0.5–3 cm., conspicuous, the outer pair often short and inconspicuous, the veinlet-reticulation coarse, prominulous on both surfaces; inflorescences axillary, racemose, 8–12-flowered, the rachis terete, stout, 6–8 cm. long at anthesis including the peduncle (1–3 cm. long), the flower-subtending bracts papyraceous, oblong-deltoid, subacute, about 2 mm. long; pedicels terete, 16–32 mm. long at anthesis, slender near base, enlarged distally to about 2 mm. in diameter and obscurely articulate with calyx, bibracteolate near base, the bracteoles inconspicuous, lanceolate, acute, 1–1.5 mm. long, scariose-margined, appressed to the pedicel, caducous; calyx coriaceous, cupuliform, at anthesis 6–7 mm. long and 7–8 mm. in apical diameter, the limb suberect, 2.5–3 mm. long including lobes, these 5 (2 sometimes semifused), broadly deltoid, 1.5–2 mm. long,

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[29] *Macleania ericae* Sleumer, Repert. Sp. Nov. Fedde **45**: 16. 1938, based on *Macleania pentaptera* Sleumer, Repert. Sp. Nov. Fedde 41: 120. 1936. Not *M. pentaptera* Hoer. (1909).

about 4 mm. broad, acute, the sinuses obtuse; corolla carnose, subglobose-urceolate at anthesis, 7–9 mm. long and in diameter, contracted at throat, the lobes 5, oblong-deltoid, acute, about 1.5 mm. long; stamens 10, free, 5–5.5 mm. long, the filaments broad, ligulate, 2–2.5 mm. long, obscurely puberulent distally like the connectives, these bearing inconspicuous obtuse spurs, the anthers 4–4.5 mm. long, the thecae stout, rounded at base, the tubules conical, acute, 1–1.5 mm. long, dehiscing by oval clefts equally long; style stout, terete, 5–6 mm. long, truncate at apex.

Type in the U. S. National Herbarium, No. 1903744, collected in wet forest on western slope of the Cordillera Occidental, west of Tambo, Department of Cauca, Colombia, alt. 2,500 meters, November 6, 1946, by O. Haught (No. 5199).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: El Valle: Western slope of Western Cordillera, valley of Río Díguа, Quebrada del San Juan, ascending to Paragüita from Queremal, alt. 1,570–1,740 m., *Cuatrecasas* 23833 (A, Ch).

Notes on the type specimen indicate it to be from a shrub 1 meter high, with a very showy pendent inflorescence of white flowers on yellow axes. The Cuatrecasas collection is from an epiphytic climbing shrub, with rigid coriaceous leaves, red pedicels and calyces, and yellow-urceolate corollas.

This is another of the peculiar globose-flowered *Psammisiae* which seem to center in the Western Cordillera of Colombia; it is closely related only to *P. breviflora* (Benth.) Kl. and *P. pedunculata* A. C. Sm., as stated above.

Psammisia orthoneura A. C. Sm. sp. nov.

Frutex foliis magnis pinnatinerviis floribusque comparate parvis distinguitur; *P. caloneurae* A. C. Sm., *P. multijugae* Sleumer, et *P. fallacis* Sleumer affinis, ab omnibus foliorum laminis basi attenuatis, nervis lateralibus etiam numerosioribus, nervo marginali recto, corolla medio conspicue inflata, connectivorum calcaribus obsoletis recedit; a *P. caloneura* calyce majore, corolla staminibusque longioribus etiam differt; a *P. multijuga* foliorum apice longiore, inflorescentia longiore, corolla antherisque brevioribus dispar; a *P. fallace* ramulis petiolisque glabris, inflorescentia longiore pluriflora, corolla longiore distinguendus.

Epiphytic or terrestrial shrub, glabrous throughout (except filaments), the branchlets terete, brownish; petioles stout, subterete, 8–10 mm. long, leaf-blades subcoriaceous, brownish when dried, narrowly elliptic-oblong, broadest at middle and gradually narrowed toward both ends, 30–35 cm. long, 8–12 cm. broad, attenuate at base and decurrent on the petiole, long-acuminate at apex with a tip about 3 cm. long, narrowly recurved at margin, somewhat bullate, pinnate-veined, the costa broad and slightly raised above, prominent beneath, the

secondary nerves 20–24 per side, subspreading, straight, prominulous in shallow sulcae above, prominent beneath, interspersed with tertiary nerves nearly as prominent, conspicuously anastomosing 2–4 mm. within the margin, the marginal nerve straight or only slightly undulating, very conspicuous, the veinlets immersed; inflorescences arising from defoliate nodes, short-racemose, 4–7-flowered, the rachis slender, 5–13 mm. long; flower-subtending bracts subcoriaceous, deltoid, acute, about 1.5 mm. long; pedicels slender, slightly thickened distally and obscurely articulate or apparently continuous with calyx, bibracteolate near base with caducous bracteoles similar to the bracts but smaller; calyx cupuliform, 7–8 mm. long and in apical diameter at anthesis, the limb erect, subcoriaceous, 2–3 mm. long including the lobes, these broadly deltoid, about 1.5 mm. long and 3 mm. broad, acute, the sinuses rounded; corolla subcarnose, urceolate, 12–13 mm. long at anthesis, conspicuously inflated and 8–10 mm. in diameter at middle, the lobes 5, oblong, obtuse, about 1.5 mm. long; stamens 10, similar, 6–6.5 mm. long, the filaments distinct, membranaceous, ligulate, about 2 mm. long, puberulent within, the connectives with obsolete spurs, the anthers 5–5.5 mm. long, the thecae mucronulate and incurved at base, the tubules about as long as the thecae, dehiscing by elongate oval clefts; style filiform, subequal to the corolla, the stigma minute.

Type in the herbarium of the Arnold Arboretum, collected at Córdoba, valley of Río Dagua, western slope of Western Cordillera, Department of El Valle, Colombia, alt. 39–60 meters, November 14, 1945, by J. Cuatrecasas (No. 19846). Duplicate in the Chicago Natural History Museum.

The collector describes the plant as an epiphytic or terrestrial shrub with rigidly coriaceous leaves which are bright green; the pedicels and calyces are dark purple, and the corolla rosy white.

The plant described above represents another of the remarkable pinnate-veined *Psammisiae* discussed by Sleumer in 1941.[30] From its closest relatives, *P. caloneura* A. C. Sm., *P. multijuga* Sleumer, and *P. fallax* Sleumer, all of which occur in the same general area, it is readily distinguished as pointed out in the above diagnosis.

Psammisia longicaulis A. C. Sm. sp. nov.

Frutex epiphyticus *P. macrophyllae* (H. B. K.) Kl. et *P. falcatae* (H. B. K.) Kl. affinis sed foliis minoribus, calyce sub anthesi multo minore, corolla breviore distinguendus, a priore rhachi elongata, a posteriore foliorum laminis proportione angustioribus etiam recedit; a *P. columbiense* Hoer. corolla breviore, staminibus brevioribus, filamentis liberis facile distinguitur; a *P. salmonea* Sleumer rhachi pedicellisque elongatis, calycis limbo profunde lobato, corolla staminibusque longioribus valde differt.

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[30] Bot. Jahrb. Engler 71: 403–404. 1941.

Epiphytic shrub, the branches elongate and sometimes pendulous, the branchlets terete, sparsely puberulent when young, at length glabrescent and grayish; petioles stout, subterete, faintly puberulent, rugulose, 5–7 mm. long; leaf-blades subcoriaceous, olivaceous when dried, elliptic-oblong, 11–15 cm. long, 4–6.5 cm. broad, broadly obtuse or subrounded at base, obtusely cuspidate or short-acuminate (apex to 1 cm. long) at apex, slightly recurved at margin, glabrous on both sides, 5-nerved, the costa and ascending principal nerves slightly impressed above, prominent beneath, the inner pair of lateral nerves concurrent with the costa for 5–12 mm., the veinlets obscure or faintly raised on both surfaces; inflorescences axillary or arising from efoliate nodes, racemose, 8–15-flowered, the rachis comparatively slender, 3–4.5 cm. long at anthesis, with the pedicels and calyx obscurely puberulent, soon glabrescent; flower-subtending bracts subcoriaceous, ovate, obtuse, about 3 mm. long, caducous; pedicels slender, subterete, 2–3 cm. long at anthesis, conspicuously articulate with calyx and surmounted by a few minute marginal glands, bibracteolate slightly below middle, the bracteoles similar to bracts but smaller; calyx cupuliform, at anthesis 5–7 mm. long, the tube 3–4 mm. long, 2.5–5 mm. in diameter, rugulose, the limb suberect, deeply 4- or 5-lobed, the lobes broadly oblong, 2–3 mm. long, 3–4 mm. broad, slightly thickened at margin, rounded or apiculate at apex; corolla thin-carnose, glabrous, cylindric, at anthesis 17–20 mm. long and 6–9 mm. in diameter, narrowed distally, the lobes 5, deltoid, acute, about 1 mm. long; stamens 10, about half as long as corolla, the filaments free or loosely coherent proximally, ligulate, about 3 mm. long, sparsely puberulent within, the alternate connectives obviously spurred, the spurs obtuse, spreading, the anthers 8–9 mm. long, the thecae narrowed at base, the tubules 2–3 mm. long, dehiscing by elongate oval clefts; style filiform, exserted at anthesis, the stigma obscurely capitate.

Type in the herbarium of the Arnold Arboretum, collected between Aguabonita and Candelaria, valley of Río San José, Moscopán region, eastern slope of Central Cordillera, Department of Cauca, Colombia, alt. 2,280–2,350 meters, January 31, 1947, by J. Cuatrecasas (No. 23580). Duplicate in the Chicago Natural History Museum.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Cauca: Moscopán region, valley of Río San José, Aguabonita, in woods, alt. 2,280 m., *Cuatrecasas* 23535 (A, Ch).

The cited specimens come from epiphytic shrubs, sometimes twisting and with hanging branches; the leaves are rigidly coriaceous, bright green above, and yellowish green beneath; the pedicels and calyces are bright red, or the calyces may be paler; the corolla is red with a white tip. No. 23535 agrees with the type in all essential details, but its stamens are slightly shorter and have essentially obsolete connective-spurs; nevertheless I believe that it must be referred to this species.

The only species with which *P. longicaulis* need be compared are those discussed in the above diagnosis, *P. macrophylla* (H. B. K.) Kl., *P. falcata* (H. B. K.) Kl., *P. columbiensis* Hoer., and *P. salmonea* Sleumer, all of which occur in Colombia.

Psammisia aberrans A. C. Sm. Journ. Arn. Arb. **27**: 95. 1946.

COLOMBIA: El Valle: Western slope of Western Cordillera, Monte La Guarida, on crest of the cordillera above La Carbonera (between Las Brisas and Albán), alt. 1,950–2,000 m., *Cuatrecasas* 22132 (A, Ch). Antioquia: Nariño, in woods of paramitos, alt. 2,000–2,200 m., *Uribe Uribe* 1860 (US).

The cited specimens are from climbing or epiphytic shrubs, with coriaceous bright green leaves; the pedicels are pinkish red; and the corollas are red or purplish pink in the lower half and white distally. The second and third collections of this recently described species agree in all respects with the type, which was obtained in the same general region of the Pacific slope of El Valle as *Cuatrecasas* 22132, but at a lower elevation of 350–450 meters.

Psammisia fissilis A. C. Sm. sp. nov.

Frutex scandens vel epiphyticus *P. coarctatae* (R. & P.) A. C. Sm. affinis, calycis limbo multo majore in lobos 3 (vel 4) 6–8 mm. longos fisso, antherarum tubulis brevioribus differt.

Liana or epiphytic shrub, glabrous throughout, the branchlets stout, terete, with loose cinereous or pale brown bark; petioles stout, rugulose, semiterete, 4–6 mm. long; leaf-blades coriaceous, brownish green when dried, narrowly elliptic- or lanceolate-oblong, 13–18 cm. long, 4.5–8 cm. broad, obtuse at base and decurrent on the petiole, tapering at apex into an acumen 1.5–2 cm. long, entire at margin, 5-nerved from near base, the secondary nerves concurrent with the costa for 1–2 cm., like the costa slightly impressed above, prominent beneath, the veinlet-reticulation faintly prominulous or immersed on both surfaces; inflorescence axillary, short-racemose, 10–15-flowered, the rachis stout, 1.5–2 cm. long, the flower-subtending bracts subcoriaceous, deltoid-oblong, 2–3 mm. long, acute, scariose-margined, persistent; pedicels striate when dried, curved, 2–3 cm. long, thickening in fruit, bibracteolate near base, the bracteoles similar to the flower-subtending bracts, persistent; calyx obscurely articulate with pedicel, large, at anthesis 10–13 mm. long and 12–15 mm. in apical diameter, the tube cupuliform, 3–4 mm. long and 4–6 mm. in diameter at anthesis, the limb subcoriaceous, spreading, deeply split into 3 (sometimes 4) lobes, these ovate, 6–8 mm. long and broad, slightly thickened at margin, acute and often bidentate at apex (indicating fusion of lobes); corolla carnose, cylindric, at anthesis 23–32 mm. long and 7–8 mm. in diameter, contracted at base and apex, the lobes 5, deltoid, subacute, about 2 mm. long and broad; stamens 10, rigidly erect, 10–12 mm. long, the filaments discrete,

broadly ligulate, 3.5–5 mm. long, puberulent and ciliolate distally, the connectives blackish, coriaceous, all spurred, the spurs of the alternate stamens conspicuous, spreading or ascending, 0.3–0.8 mm. long, the anthers 9–10 mm. long, the thecae narrowed at base, much longer than the tubules, these 2–3 mm. long, dehiscing by elongate oval clefts; style filiform, exserted at anthesis, the stigma truncate; fruit subglobose, up to 12 mm. in diameter, coriaceous, rugulose, surmounted by the conspicuously cleft calyx-limb, the style caducous.

Type in the herbarium of the Chicago Natural History Museum, No. 1255157, collected between Tambo Cachiyacu, La Entrada, and Nuda de Sabanillas, Province of Loja, Ecuador, alt. 2,500–3,500 meters, October 7, 1943, by J. A. Steyermark (No. 54408). Duplicate in the herbarium of the Arnold Arboretum.

ADDITIONAL SPECIMENS EXAMINED:

ECUADOR: Loja: Western slopes of Cordillera de Condor and northwest slopes of Nudo de Sabanillas, around Tambo Cachiyacu, along Río Cachiyacu, about 2 leagues southeast of Yangana, alt. 2,000–3,000 m., *Steyermark* 54777 (A, Ch).

The collector notes that the calyx is vermilion-red with whitish lobes and the corolla vermilion-red in the lower two-thirds and rose-colored or white distally. From its only close ally, the Peruvian *P. coarctata* (R. & P.) A. C. Sm., *P. fissilis* differs principally in its large and deeply cleft calyx-limb ,which splits into large flaring lobes. The recently described Colombian *P. macrocalyx* A. C. Sm. has a calyx suggesting that of the new species, from which it differs obviously in foliage, position of pedicellary bracteoles, its deeply lobed corolla, etc.

Anthopterus oliganthus A. C. Sm. sp. nov.

Arbor parva *A. wardii* Ball affinis, habitu caulifloro, ramulis petiolisque validioribus, foliorum laminis majoribus pinnatinerviis, inflorescentia pauciflora, calyce paullo majore, corolla cum alis angustioribus obscure nervatis differt.

Tree about 5 m. high, the branchlets terete, stout, pale brown or cinereous, closely pale-puberulent when young, soon glabrescent, with occasional internodal bracts, these papyraceous, linear, 10–14 mm. long, 2–3 mm. broad, acute, glabrous; petioles stout, subterete, rugulose, 3–4 mm. long; leaf-blades subcoriaceous, olivaceous when dried, narrowly elliptic-oblong, 12–19 cm. long, 4.2–9 cm. broad, narrowly subcordate at base, gradually narrowed to an acuminate apex about 1 cm. long, slightly thickened at margin, glabrous above or sparsely puberulent on the costa, obscurely glandular-pilose beneath with scattered minute brownish hairs, pinnatinerved, the costa nearly plane above, prominent beneath, the secondary nerves 5–7 per side, curved-ascending, plane or impressed above, sharply raised beneath, the veinlet-reticulation plane or prominulous on both surfaces; inflorescence arising from defoliate branches or apparently sometimes axillary, short-racemose, apparently 2–4-flowered, the rachis slender, 1–1.5 cm.

long, glabrous or with a few obscure glandular hairs; flower-subtending bracts papyraceous, oblong, 4–5 mm. long, about 2 mm. broad, obtuse, glabrous; pedicels terete, fleshy, gradually enlarged distally, 15–20 mm. long at anthesis, bearing a few minute scattered blackish glandular hairs, apparently ebracteolate; calyx about 14 mm. long, the tube sparsely glandular like the pedicels, about 5 mm. long and 6–7 mm. in diameter including the wings, these conspicuous, about 2 mm. broad, the limb suberect, longer than the tube, glabrous, the lobes triangular, 5–6 mm. long and broad, acute, conspicuously veined; corolla thin-carnose, cylindric-urceolate, sparsely blackish-glandular distally, 11–12 mm. long, about 5 mm. in diameter including the wings, these comparatively inconspicuous, about 1 mm. broad, obscurely veined, the lobes 5, deltoid, about 1 mm. long and broad; stamens about 9 mm. long, the filaments pale, about 4 mm. long, connate for half their length, sparsely glandular dorsally toward apex, otherwise glabrous, the anthers about 5.5 mm. long, the tubules subequal to the thecae in length, dehiscing by elongate clefts; disk annular-pulvinate, glabrous; style filiform, about as long as corolla, the stigma minute.

Type in the U. S. National Herbarium, No. 1903743, collected in wet forest on the western slope of the Cordillera Occidental, west of Tambo, Department of Cauca, Colombia, alt. 2,400 meters, by O. Haught (No. 5198).

The collector describes the plant as a small tree about 5 meters high, with a tendency toward cauliflory; the flowers are bright red and showy. The new species is closely related only to *A. wardii* Ball, being distinguished by the several obvious characters mentioned in the above diagnosis. In foliage, our plant suggests the Peruvian *A. racemosus* Hook., but that species has elongate many-flowered racemes, short calyx-lobes, and anthers with comparatively elongate tubules.

Thibaudia pachypoda A. C. Sm. Journ. Arn. Arb. 27: 97. 1946.

COLOMBIA: El Valle: Pacific coast, Buenaventura Bay, Quebrada de San Joaquin, alt. 0–10 m., *Cuatrecasas* 19876 (A, Ch).

The third collection of this striking species, from the same general region and elevation as the first two, agrees with them in all respects. The present specimen comes from a large branching liana, with rigid and thick-coriaceous leaves which are bright green above and somewhat duller beneath; the pedicels and bases of calyces are purplish pink, while the tip of the calyx-lobes and the corolla are white with a pinkish tinge.

Thibaudia paniculata A. C. Sm. Contr. U. S. Nat. Herb. 28: 426. 1932.

COLOMBIA: El Valle: Km. 101 on Cali-Buenaventura Highway, alt. about 100 m., *Haught* 5331 (US).

The cited specimen is from a large, scrambling, apparently epiphytic shrub; the inflorescence is very showy, with white flowers on red axes. Apparently it is the second collection of this species, which was based upon *Lehmann* K176, from Timbiquí, presumably at a similarly low elevation. As compared to the type, the Haught specimen has larger leaf-blades (up to 25 by 14 cm.), which are not appreciably bullate. The chief differences between this species and the closely related *T. archeri* A. C. Sm., recently [31] reported from additional material in El Valle, lie in the shape and proportions of the leaf-blades.

Thibaudia pennellii A. C. Sm. Contr. U. S. Nat. Herb. 28: 427. 1932.

COLOMBIA: Antioquia: Near Santa Elena, between Medellín and Río Negro, in woods, alt. 2,300–2,500 m., *C. Rodriguez P.* 9 (US).

The cited collection is the second known to me of this distinctive species; the type is from the Department of Tolima.

Thibaudia fallax A. C. Sm. sp. nov.

Frutex epiphyticus a speciebus typicis *Thibaudiae* valde dispar; *T. anomalae* A. C. Sm. affinis, foliorum laminis basi subcordatis vel rotundatis, inflorescentiae bracteis minoribus inconspicuis, corolla fere triplo longiore, staminibus multo longioribus, antherarum tubulis quam thecis longioribus valde differt.

Epiphytic shrub, the branchlets terete, brownish, slender, spreading-white-pilose, at length glabrescent and with loose cinereous bark; stipules intrapetiolar, paired, subulate from a stout base, 2–4 mm. long, sparsely pilose; petioles slender, semiterete, rugulose, 2–5 mm. long, pilose like the branchlets; leaf-blades coriaceous, dull greenish when dried, narrowly ovate-oblong, 2.5–4 cm. long, (0.8–) 1–2 cm. broad, subcordate or rounded at base, obtuse at apex, thickened and narrowly recurved at margin, undulate or crenulate (teeth about 3 per centimeter, glandular-mucronulate), faintly yellow-glandular-punctate and sometimes pilose above, pilose beneath with lax white hairs about 1 mm. long and also scattered-brown-punctate, at length glabrescent, pinnate-nerved, the costa slightly impressed above, raised beneath, the secondary nerves 2–4 per side, curved-ascending, immersed above, slightly raised beneath, the veinlets obscure; inflorescences subterminal or axillary, racemose, 3–10-flowered, uniformly and copiously pilose (on rachis, bracts and bracteoles, pedicels, calyx, and corolla) with weak spreading whitish hairs 0.5–0.8 mm. long; rachis slender, 3–10 mm. long (rarely to 3 cm. long when subterminal), the flower-subtending bracts subfoliaceous or papyraceous, lanceolate or oblong, 3–10 mm. long; pedicels slender, striate, 10–15 mm. long, articulate with calyx, bibracteolate near base, the bracteoles submembranaceous.

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[31] Journ. Arn. Arb. 27: 98. 1946.

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lanceolate, 3–7 mm. long; calyx 11–12 mm. long at anthesis, the tube cupuliform, 4–5 mm. long and about 3 mm. in diameter, the limb suberect, papyraceous, 7–8 mm. long and in apical diameter, 5-lobed, the lobes deltoid, subacute, 3–5 mm. long and about 3 mm. broad, with a conspicuous midrib and a few irregular lateral nerves, glabrous within, the sinuses obtuse or narrowly rounded; corolla thin-carnose, cylindric, 27–29 mm. long, 5–6 mm. in diameter, narrowed at throat, puberulent distally but otherwise glabrous within, the lobes 5, broadly deltoid, obtuse, about 1.5 mm. long and 2 mm. broad; stamens 10, much shorter than corolla, 15–17 mm. long, the filaments membranaceous, firmly connate to apices in a tube, this 5–6 mm. long, distally strigose without and puberulent within, the anthers 11–13 mm. long, the thecae 5–6 mm. long, obtuse at base, the tubules slightly longer than the thecae, dehiscing by elongate clefts; style exserted at anthesis, filiform, the stigma minutely capitate; calyx-tube greatly enlarging after anthesis, subglobose, up to 12 mm. in diameter, rugulose, subpersistently pilose, surmounted by the persistent limb.

Type in the U. S. National Herbarium, No. 1951711, collected on páramo along Quebrada de las Vegas, headwaters of Río Tuluá, western slope of Central Cordillera, Department of El Valle, Colombia, alt. 3,400–3,500 meters, March 23, 1946, by J. Cuatrecasas (No. 20372). Duplicates in the herbaria of the Chicago Natural History Museum and the Arnold Arboretum.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: El Valle: Western slope of Central Cordillera, valley of Río Bugalagrande, Barragán, Páramo de Bavaya, Corrales, alt. 3,450–3,520 m., *Cuatrecasas* 20158 (A, Ch).

The plant described above is said to be an epiphytic shrub, sometimes arising from a tubercle; the leaves are thick-coriaceous, rigid, and bright green or lead-green; the calyx is red and the corolla pinkish.

Because of its general habit, stipules, and large calyx-limb, the plant here described is remarkably suggestive of the genus *Plutarchia*, and especially of *P. guascensis* (Cuatr.) A. C. Sm., but its fundamental characters are those of *Thibaudia*. With T. *anomala* A. C. Sm. it forms an isolated group in the genus; the two species are readily differentiated as noted in the above diagnosis.

Thibaudia diphylla Dun. in DC. Prodr. 7: 562. 1839.

Vaccinium leucostomum Lindl. Gard. Chron. 1848: 7. 1848.
Eurygania ovata Hook. f. Bot. Mag. Curtis 104: *pl. 6393*. 1878.
Thibaudia ovata Hoer. Bot. Jahrb. Engler 42: 275. 1909.
Thibaudia graebneriana Hoer. Bot. Jahrb. Engler 42: 313. 1909.
Thibaudia leucostoma Sleumer, Notizbl. Bot. Gart. Berlin 12: 291. 1935.

In 1935 Sleumer showed that the specific epithet *ovata*, accepted in my previous revision,[32] was antedated by *Vaccinium leucostomum*

[32] Contr. U. S. Nat. Herb. 28: 433. 1932.

Lindl. However, a still older name, *Thibaudia diphylla* Dun., must be utilized for this concept, as indicated by examination of the type (*Dombey*, in the Paris Herbarium). I had reached this conclusion while in Paris in 1932 but have neglected to publish the reduction to synonymy of *Thibaudia ovata;* a photograph of the type is now available through the kindness of the Chicago Natural History Museum.

Thibaudia steyermarkii A. C. Sm. sp. nov.

Frutex epiphyticus habitu gracili piloso, foliorum laminis parvis ovatis, inflorescentia axillari uniflora bracteis numerosis angustis subtenta, floribus sessilibus, calycis lobis elongatis, antherarum tubulis angustis facile distinguitur; *T. aurantiae* A. C. Sm. et *T. mundulae* A. C. Sm. colombiensibus affinis, inflorescentiae bracteis, floribus sessilibus, corolla breviore valde differt.

Epiphytic shrub, the branchlets elongate, slender, copiously pilose with pale yellowish or whitish spreading hairs about 1 mm. long, at length glabrescent; petioles semiterete, 2–3 mm. long, pilose; leaf-blades subcoriaceous, ovate, 2–3 cm. long, 1.5–2.5 cm. broad, rounded or faintly subcordate at base, subacute and callose-apiculate at apex, entire and thickened at the recurved margin, copiously soft-pilose on both sides like the branchlets, at length glabrescent above, 5- or 7-nerved from near base, the costa prominulous above, slightly raised beneath, the secondary nerves arcuate-ascending, often inconspicuous, the veinlets subimmersed; inflorescences axillary, apparently 1-flowered, subtended by very numerous imbricate bracts, these papyraceous, ligulate or lanceolate, the largest ones 8–10 mm. long and 1–3 mm. broad, narrowed at base, acute at apex, copiously spreading-pilose like the leaves, concealing the calyx; flowers essentially sessile, the calyx 6–7 mm. long at anthesis, the tube obconical, tapering at base, faintly puberulent, the limb suberect, 5-lobed nearly to base, the lobes faintly nerved, elongate-deltoid, about 3 mm. long and 1.5 mm. broad, acute, pilose at margins, the sinuses acute; corolla thin-carnose, subcylindric, about 10 mm. long and 3 mm. in diameter at anthesis, slightly narrowed distally, faintly puberulent without, the lobes 5, deltoid, obtuse, about 1 mm. long; stamens 10, slightly shorter than the corolla, the filaments firmly connate into a tube about 2.5 mm. long, sparsely pilose distally, the anthers 5–6 mm. long, the tubules subequal to the thecae in length but somewhat narrower, dehiscing by elongate clefts; disk pulvinate, glabrous; style filiform, nearly as long as the corolla, truncate at apex.

Type in the herbarium of the Chicago Natural History Museum, No. 1255120, collected on wooded slopes along Río Valladolid, between Quebrada Honda and Tambo Valladolid, Province of Santiago-Zamora, Ecuador, alt. 2,000–3,000 meters, October 12, 1943, by J. A. Steyermark (No. 54589). Duplicate in the herbarium of the Arnold Arboretum.

The collector notes that the plant occurred as an epiphyte with his No. 54588, and that it had a pale green calyx and dull red corolla. Many unusual features characterize this plant, such as the numerous narrow bracts subtending the inflorescence, which appears to be reduced to a single essentially sessile flower, but I can place it only in the genus *Thibaudia*. Its alliance is probably with the two recently described Colombian species [33] mentioned in the above diagnosis, but differentiating characters are several and obvious.

Thibaudia crenulata Remy, Ann. Sci. Nat. III. Bot. 8: 234. 1847.

Hornemannia boliviensis Kuntze, Rev. Gen. Pl. 3 [2]: 191. 1898.
Thibaudia boliviensis Hoer. Bot. Jahrb. Engler 42: 275. 1909.
Thibaudia neo-herrerae Sleumer, Notizbl. Bot. Gart. Berlin 12: 136. 1934.

In 1932 [34] I was unable to place *T. crenulata* Remy, but a photograph of the type (*d'Orbigny*, from Chupi, Yungas, Bolivia, in the Paris Herbarium) indicates beyond question that Remy's binomial must replace *T. boliviensis* (Kuntze) Hoer. Since my discussion of the latter entity (op. cit. 437) I have seen specimens of it from the Department of Cuzco, Peru (*West* 6437 and *Vargas* 1564, both in the Gray Herbarium).

Two specimens in the U. S. National Herbarium (*Herrera* 3279 and 3317, from Machupicchu, Cuzco, Peru) apparently also represent *T. crenulata*. It is probable that one of these is a type duplicate of *Thibaudia neo-herrerae* Sleumer, based upon a collection of Herrera in the Berlin Herbarium from Cuzco but without number or other data. A fragment of the actual type of Sleumer's species is available and could have come from either of the Herrera numbers mentioned above.

Plutarchia coronaria (Hook. f.) A. C. Sm. Bull. Torrey Club 63: 311. 1936.[35]

COLOMBIA: Norte de Santander: Páramo de Fontibón, alt. 2,600–2,750 m., *Cuatrecasas, Schultes, & E. Smith* 12282 (A, US). Valley of Río Chitagá at Vega Colombia, alt. 2,880 m., *Cuatrecasas* 13461 (US).

The cited collections indicate that *P. coronaria* is sometimes more robust throughout and more variable in shape and size of leaves than indicated in my previous description of it.[36] The following emendation seems desirable:

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[33] Journ. Arn. Arb. 27: 98–100. 1946.
[34] Contr. U. S. Nat. Herb. 28: 438. 1932.
[35] In proposing this combination in 1936 I mentioned the parenthetical author as Linden. However, the original description of the basonym, *Thibaudia coronaria*, was by Hooker (Bot. Mag. Curtis 92: *pl. 5575.* 1866); there the binomial "*Ceratostemma coronaria*" Linden was published only in synonymy and therefore invalidly.
[36] As *Ceratostema coronarium;* Contr. U. S. Nat. Herb. 28: 344. 1932.

Leaf-blades sometimes narrowly oblong or oblong-ovate, up to 22 mm. long; flowers sometimes aggregated in fascicles of 3–5, the pedicels up to 12 mm. long, sometimes conspicuously pilose, the bracteoles up to 3 mm. in length, bearing a few stalked marginal glands and also pale-ciliolate; calyx up to 7 or 8 mm. long at anthesis, the tube narrowly 5-winged to sinuses with inconspicuous wings 1 mm. broad or less, the limb up to 5 mm. long, with lobes often 3 mm. long and broad and margined with small stalked glands; corolla up to 16 mm. long and 6 mm. in diameter, often subpersistently pilose; stamens up to 14 mm. long, the filaments up to 3 mm. long and often conspicuously pilose distally, the anthers 10–12 mm. long, the tubules 7–8 mm. long.

Plutarchia dasyphylla A. C. Sm. sp. nov.

Frutex copiose foliatus *P. coronariae* (Hook. f.) A. C. Sm. affinis, habitu glabro, foliorum laminis praecipue latitudine majoribus, pedicellorum bracteolis et calycis lobis longioribus et dense glandulosomarginatis, calycis tubo inconspicue angulato, antherarum tubulis proportione brevioribus differt.

Shrub 1–3 m. high, densely foliate, glabrous throughout (except for glandular-ciliolate bracts and bracteoles and pilose filaments), the branchlets stout, rugulose, brownish or distally purpurascent; stipules intrapetiolar, pulvinate, connate, about 1 mm. long; petioles subterete, rugulose, 2–4 mm. long; leaf-blades coriaceous, pale brown when dried, ovate-elliptic, 15–30 mm. long, 10–16 mm. broad, rounded or broadly obtuse at base and apex, entire at margin, punctate beneath with scattered brown glands, pinnate-nerved, the costa slightly impressed above and raised beneath, the secondary nerves 2 or 3 per side, ascending, often obscure, the veinlets immersed; inflorescences axillary, essentially fasciculate (rachis stout, irregular, less than 3 mm. long), 4–8-flowered, circumscribed by numerous bracts, these papyraceous, obovate-oblong, rounded at apex, sometimes obscurely glandular-margined, caducous, the largest ones up to 10 mm. long and 5 mm. broad, the flower-subtending bracts similar but smaller; pedicels stout, rugulose, 4–8 mm. long at anthesis, clearly articulate with calyx, bibracteolate proximally and often also with another 1 or 2 bracteoles near apex, the bracteoles submembranaceous, linear-lanceolate, 4–5 mm. long, 0.5–1 mm. broad, acute, conspicuously glandular-ciliolate; calyx at anthesis 7–8 mm. long and in apical diameter, the tube inconspicuously 5-angled, about 3 mm. long and in diameter, the limb subspreading, deeply 5-lobed, the lobes ovate-lanceolate, 3–4.5 mm. long, about 2 mm. broad, acute, copiously margined with minute glandular hairs, these sometimes partially confluent to form an apparently scariose border, the sinuses acute; corolla thin-carnose, cylindric or cylindric-urceolate, at anthesis 12–13 mm. long and about 5 mm. in diameter, the lobes 5, deltoid, subacute, 1.5–2 mm. long; stamens 10, alternately

slightly unequal, 8–10 mm. long, the filaments ligulate, 2–3 mm. long, copiously short-pilose on both surfaces, the anthers 6.5–9 mm. long, the thecae nearly smooth, the tubules 4–6 mm. long, dehiscing by elongate clefts; style slightly shorter than corolla, filiform, the stigma inconspicuously capitate.

Type in the U. S. National Herbarium, No. 1951890, collected in wet dense forest in the mountains in the vicinity of Bucaramanga, Department of Santander, Colombia, alt. about 2,500 meters, August 27, 1948, by F. A. Barkley and J. Araque M. (No. 18S123).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Santander: In open savannas, pastures, and woods, in humid and stony places near the Páramo de Santurbán, alt. about 3,000 m., *Barkley & Araque* 18S144 (US), 18S147 (US).

The cited collections are described as erect shrubs up to 3 meters in height, with red flowers and green fruits. From *P. coronaria* (Hook. f.) A. C. Sm., its only close ally, *P. dasyphylla* is readily differentiated as mentioned in the above diagnosis.

Plutarchia minor A. C. Sm. sp. nov.

Frutex dense foliatus *P. rigidae* (Benth.) A. C. Sm. et *P. pubiflorae* (Wedd.) A. C. Sm. affinis, foliorum laminis multo minoribus, calycis lobis corolla staminibusque brevioribus facile distinguitur; a priore floribus solitariis vel binis et pedicellis brevioribus, a posteriore habitu et corolla glabris etiam recedit.

Epiphytic shrub, densely foliate, essentially glabrous throughout, the branchlets inconspicuously angled, cinereous or distally pale brown; stipules intrapetiolar, connate, pulvinate, rounded, about 1 mm. long; petioles swollen, 2–4 mm. long; leaf-blades coriaceous, olivaceous when dried, suborbicular-ovate, 10–16 mm. long, 8–13 mm. broad, lightly cordate at base, rounded at apex, entire and obviously thickened at margin, glabrous above, scattered-brown-pilose beneath with appressed hairs about 0.5 mm. long, obscurely nerved, the costa faintly impressed above and elevated beneath, the secondary nerves usually 2 per side, ascending from near base, inconspicuous or immersed, the veinlets immersed; flowers axillary, solitary or paired, subtended by several imbricate papyraceous bracts, the largest (innermost) of these oblong-obovate, about 9 mm. long and 5 mm. broad, caducous, the outer ones sometimes faintly puberulent and glandular-ciliolate-margined; pedicels striate, 3–5 mm. long, inconspicuously puberulent, glabrescent, conspicuously articulate with calyx, apparently ebracteolate; calyx at anthesis about 9 mm. long and in apical diameter, the tube furrowed, subapophysate or truncate at base, about 2.5 mm. long and 3–4 mm. in diameter, the limb papyraceous, suberect, deeply 5-lobed, the lobes ovate-lanceolate, about 6 mm. long and 3 mm. broad, acute, with slender irregular veins not reaching the margins, ciliolate with short slen-

der glandular hairs; corolla thin-carnose, glabrous, cylindric, about 20 mm. long and 5 mm. in diameter near middle, broadened distally, the lobes 5, broadly deltoid, about 2 mm. long and 4 mm. broad; stamens 10, shorter than corolla, alternately slightly unequal, the filaments free, ligulate, 1.5–2 mm. long, ciliolate-margined distally with whitish hairs about 1 mm. long, the stamens about 14 mm. long, the thecae about 3 mm. long, the tubules 3–4 times as long as the thecae, dehiscing by short clefts; style filiform, subequal to corolla, the stigma minutely capitate.

Type in the herbarium of the Arnold Arboretum, collected on páramo along Quebrada de Las Vegas, headwaters of Río Tuluá, western slope of Central Cordillera, Department of El Valle, Colombia, alt. 3,400–3,500 meters, March 23, 1946, by J. Cuatrecasas (No. 20387). Duplicate in the Chicago Natural History Museum.

This attractive small-leaved plant is clearly distinguished from its only close allies, *P. rigida* (Benth.) A. C. Sm. and *P. pubiflora* (Wedd.) A. C. Sm., by the reduced size of its parts. The collector notes that the new species is an epiphytic shrub with rigidly coriaceous bright green leaves; the corolla is red with a yellow margin.

Plutarchia miranda A. C. Sm. sp. nov.

Frutex epiphyticus gracilis *P. angulatae* A. C. Sm. valde affinis, foliorum laminis glabris basi profunde cordatis, floribus solitariis vel binis, rhachi subnulla, pedicellis gracilibus longioribus, calyce multo majore cum lobis lanceolatis longitudine corollam subaequantibus facile distinguitur.

Small epiphytic shrub, the branchlets slender, subterete or striate, cinereous or purpurascent, pale-puberulent, glabrescent; leaves essentially sessile and probably amplexicaul, the petioles 1–2 mm. long, glabrous, the blades subcoriaceous, drying greenish, suborbicular-ovate, (2.5–) 3–5 cm. long and broad, deeply cordate at base, broadly obtuse or rounded at apex, slightly thickened and recurved at margin, faintly puberulent when young on both surfaces, soon glabrous, 7- or 9-nerved from base, the secondary nerves spreading, curved, like the costa slightly elevated on both surfaces, the veinlet-reticulation often prominulous on both surfaces; flowers axillary, solitary or paired, the rachis if present 1–2 mm. long, the flower-subtending bracts lanceolate, 1–1.5 mm. long, puberulent, caducous; pedicels slender, striate, 22–30 mm. long at anthesis, pale-puberulent, bibracteolate near base, the bracteoles similar to the bracts, caducous; calyx articulate with pedicel, about 25 mm. long at anthesis, sparsely white-puberulent, the tube obviously 4-winged to sinuses, about 5 mm. long and 8 mm. in diameter including the wings, these papyraceous or subcoriaceous, 2–3 mm. broad, the limb 4-lobed to base, the lobes stiff, suberect, nearly as long as corolla, lanceolate, 18–20 mm. long, 5–6 mm.

broad, acute, glabrous within, copiously parallel-veined; corolla thin-carnose, cylindric, at anthesis 17–20 mm. long and 4–5 mm. in diameter, slightly narrowed distally, copiously pilose without with weak spreading whitish hairs 0.5–1 mm. long, glabrous within, the lobes 4, oblong-deltoid, subacute, about 1.5 mm. long; stamens 8, equal, nearly as long as corolla, the filaments ligulate, about 2 mm. long, free, glabrous, narrowed distally, the anthers 16–18 mm. long, the thecae nearly smooth, 6–7 mm. long, the tubules longer than the thecae, dehiscing by elongate clefts; style filiform, subequal to the corolla, truncate at apex.

Type in the herbarium of the Arnold Arboretum, collected in woods at Aguabonita, valley of Río San José, Moscopán region, eastern slope of Central Cordillera, Department of Cauca, Colombia, alt. 2,280 meters, January 31, 1947, by J. Cuatrecasas (No. 23545).

The plant described above, remarkable for the extraordinarily long calyx-lobes, is readily distinguished from its only close ally, *P. angulata* A. C. Sm., by the characters mentioned in the above diagnosis. The collector notes it as a small epiphytic shrub with rigidly coriaceous bright green leaves; the calyx is pale green, rosy at the base, and the corolla is greenish white.

Cavendishia tenella A. C. Sm. Journ. Arn. Arb. 27: 106. 1946.

COLOMBIA: El Valle: Chocó region, Río Calima, right bank, beaches at Pailón, alt. 60 m., *Cuatrecasas* 21237 (A, Ch).

The second collection of this very distinct species, from the same general region as the type, agrees closely with it. The plant is noted as an epiphytic shrub with rigidly coriaceous leaves which are shining grayish green above and bright green beneath; the bracts are white, the calyx is bright green, and the corolla dirty white.

Cavendishia splachnoides A. C. Sm. Contr. U. S. Nat. Herb. 28: 471. 1932.

COLOMBIA: Chocó: Río San Juan, right bank, Quebrada del Taparal, alt. 5–20 m., *Cuatrecasas* 21506 (A, Ch). El Valle: Chocó region, Río Calima, right bank, beaches at Pailón, alt. 60 m., *Cuatrecasas* 21233 (A, Ch). Km. 101 on Cali-Buenaventura highway, alt. about 100 m., *Haught* 5332 (US).

The cited specimens are interesting additions to a species previously known from two Panama specimens and one from Chocó;[37] the specimens from El Valle represent a southern extension of the known range.

Cavendishia purdiei A. C. Sm. Contr. U. S. Nat. Herb. 28: 472. 1932.

COLOMBIA: Caldas: La Selva, western slope of Western Cordillera, alt. 1,600–1,900 m., *von Sneidern* 5272 (Ch), 5369 (Ch, US).

This species has previously been known only from the type, collected by Purdie in Colombia without precise data. The cited col-

[37] Cited in Amer. Journ. Bot. 27: 543. 1940.

lections from Caldas agree excellently with the type and permit the following slight additions to the original description:

Leaf-blades sometimes only 4 cm. long and 0.8 cm. broad; inflorescence with as many as 13 flowers, the rachis up to 1 cm. in length; pedicels up to 7 mm. long, minutely bibracteolate near base, the bracteoles lanceolate, about 1.5 mm. long; stamens up to 13 mm. in length, the filaments alternately about 2 mm. and 5 mm. long, the anthers alternately about 12 mm. and 10 mm. long, the thecae 2–3 mm. long.

Cavendishia porphyrea A. C. Sm. sp. nov.

Species *C. coccineae* A. C. Sm. et *C. urophyllae* A. C. Sm. affinis, pedicellis longioribus bracteolas suborbiculari-ovatas gerentibus, calycis tubo valde apophysato, lobis conspicue calloso-incrassatis non margine glandulosis, corolla longiore distinguitur; a *C. coccinea* etiam inflorescentia breviore et pauciflora, bracteis floriferis multo minoribus et apice rotundatis, antheris longioribus distinguenda; a *C. urophylla* foliis brevioribus, inflorescentia longiore, bracteis basalibus inconspicuis, bracteis floriferis suborbiculari-ovatis minoribus, antherarum tubulis quam thecis multo longioribus valde differt.

Shrub, probably epiphytic, glabrous throughout, the branchlets slender, terete, brownish; petioles rugulose, slender, 4–5 mm. long; leaf-blades coriaceous, dull olivaceous when dried, elliptic-ovate, 3–5 cm. long, 1.3–2.3 cm. broad, obtuse at base, abruptly and conpicuously caudate-acuminate at apex (acumen 12–20 mm. long, very slender), narrowly recurved at margin, sparsely punctate beneath with small reddish glands, 3-nerved from base (fourth and fifth nerves sometimes present, then short and obscure), the costa sharply impressed above, elevated beneath, the second and third nerves less conspicuous, the veinlets immersed; inflorescence terminal, racemose, 2–4-flowered (but probably sometimes with more flowers, as indicated by additional bracts), circumscribed at base by a few papyraceous deltoid bracts about 1 mm. long, the rachis slender, striate, 2.5–3.5 cm. long, bearing a few sessile scattered but obvious globose glands; flower-subtending bracts papyraceous, suborbicular-ovate, 6–9 mm. in diameter, rounded at apex, copiously margined with sessile subglobose glands; pedicels stout, subterete, 10–12 mm. long at anthesis, glandular like the rachis, bibracteolate near middle, the bracteoles similar to the bracts but smaller, 3–4 mm. in diameter; calyx about 8 mm. long and in apical diameter at anthesis, the tube strongly apophysate, rugose, truncate at base, the limb suberect, about 5 mm. long, subcoriaceous, the lobes 5, triangular, about 3 mm. long and 4 mm. broad, subacute, conspicuously callose-thickened at the apical margins but otherwise eglandular, the sinuses rounded; corolla cylindric,

37–40 mm. long at anthesis and 6–7 mm. in diameter, the lobes 5, oblong, 2–3 mm. long, subacute; stamens nearly as long as the corolla, free, the filaments ligulate, obscurely puberulent within, alternately 2–3 mm. and 7–8 mm. long, the anthers alternately about 30 mm. and 23 mm. long, the thecae 6–7 mm. long, the tubules much longer than the thecae, dehiscing by elongate clefts; style slender, about as long as the corolla, truncate at apex.

Type in the U. S. National Herbarium, No. 1903795, collected in wet forest near Chuare, Department of Cauca, Colombia, alt. about 100 meters, December 23, 1946, by O. Haught (No. 5372).

The specimen is said to be from a slender scrambling shrub, probably epiphytic, with shoots to about 1 meter long; the rachises and bracts of the inflorescence are red, and the corollas are dark purple and showy.

Although the affinity of this new species would be indicated by my published key [38] to be with *C. splachnoides* A. C. Sm., it is actually more closely allied to *C. coccinea* and *C. urophylla*, being readily distinguished as mentioned in the above diagnosis. These last two species and *C. porphyrea* are easily recognized by their small caudate-acuminate leaf-blades and their glandular-margined flower-subtending bracts and pedicellary bracteoles.

Cavendishia micayensis A. C. Sm. Journ. Arn. Arb. 27: 114. 1946.

COLOMBIA: El Valle: Western slope of Western Cordillera, valley of Río Dígua, Río San Juan, below Queremal to the right of the river between kilometers 52 and 53, alt. 1,300–1,500 m., *Cuatrecasas* 23872 (A, Ch).

The specimen is said to be from an epiphytic shrub with thick rigidly coriaceous leaves which are pale bright green; the bracts are vinous red and the corolla yellowish white. In the same paper in which the present species was described I also proposed *C. chlamydantha* (op. cit. 113. *fig. 4*), based on a specimen from lower elevation on the Pacific coast. At first glance, No. 23872 could be referred to either *C. micayensis* or *C. chlamydantha*, the two species being very similar in general aspect and foliage. However, their calyces are very different, and in this respect our plant definitely belongs with *C. micayensis*. No. 23872 has the corolla about 25 mm. long at anthesis, whereas the type of *C. micayensis* has it only 12–14 mm. long; the corolla of *C. chlamydantha* is about 37 mm. long. In this character, therefore, our specimen is intermediate.

Cavendishia tryphera A. C. Sm. sp. nov.

Frutex epiphyticus *C. roseae* A. C. Sm. affinis, foliorum laminis basi rotundatis vel late obtusis et apice caudato-acuminatis, pedicellis

[38] Contr. U. S. Nat. Herb. 28: 463–467. 1932.

multo brevioribus apice conspicue glandulosis bracteolas minutas gerentibus, calycis lobis margine conspicue glandulosis, corolla antherisque longioribus valde differt.

Robust epiphytic shrub, glabrous throughout, the branchlets terete, slender, pale brown when dried; petioles slender, rugulose, 5–9 mm. long; leaf-blades coriaceous, olivaceous when dried, ovate-oblong, (4.5–) 8–13 cm. long, (2.5–) 3–6.5 cm. broad, rounded or broadly obtuse at base, caudate-acuminate at apex (acumen 1.5–2.5 cm. long, slender), narrowly recurved at margin, 7- or indistinctly 9-nerved from base, the costa and principal nerves slightly impressed above, elevated beneath, the outer nerves short and inconspicuous, the veinlet-reticulation coarse, scarcely visible; inflorescence terminal, racemose, 12–25-flowered (lower flowers often caducous), the rachis up to 9 cm. long at anthesis, stout (about 3 mm. in diameter), conspicuously swollen at bases of pedicels, circumscribed at base by a few minute bracts, marked toward base by the scars of fallen (and perhaps larger) bracts; flowers subtended by involute enveloping bracts, these papyraceous, ovate-elliptic, 23–26 mm. long, about 15 mm. broad, rounded at apex, scarious toward margin, dorsally glandular; pedicels terete, 3–4.5 mm. long, stout (about 1.8 mm. in diameter), conspicuously glandular at the calyx-articulation with large crowded pale sessile oblong glands, inconspicuously bibracteolate near middle, the bracteoles oblong-deltoid, about 1 mm. long, broadly glandular at margin; calyx obconical, 4.5–6 mm. long, the tube smooth, the limb suberect, membranaceous, translucent, 2–3 mm. long, 5-lobed, the lobes broadly deltoid, apiculate, each flanked by two thick oblong glands about 1.5 mm. long, the sinuses rounded; corolla thin-carnose, cylindric, at anthesis about 22 mm. long and 4–5 mm. in diameter, the lobes 5, oblong-deltoid, 1–2 mm. long; stamens nearly as long as the corolla, the filaments slender, ligulate, obscurely puberulent distally within, alternately 2–3 mm. and 5–8 mm. long, the anthers alternately 17–18 mm. and 13–15 mm. long, the thecae 4–7 mm. long, the tubules much longer than the thecae, dehiscing by elongate clefts; style subequal to corolla, filiform, truncate at apex.

Type in the herbarium of the Arnold Arboretum, collected at quebradita at Kilometer 51, left side of Río San Juan in the region of Queremal, valley of Río Dígua, western slope of Western Cordillera, Department of El Valle, Colombia, alt. 1,540–1,650 meters, February 25, 1947, by J. Cuatrecasas (No. 23720). Duplicate in the Chicago Natural History Museum.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: El Valle: Valley of Río Dígua, Quebrada of Río San Juan, above Queremal, Las Colonias, alt. 1,950–2,050 m., *Cuatrecasas* 23926 (A, Ch).

The specimens are said to be from robust epiphytic shrubs with coriaceous light green leaves and red bracts and corollas. Although at first glance the new species, in its stout rachis, its involute bracts in-

vesting the flowers, and its short pedicels, suggests such species as *C. compacta* A. C. Sm., examination of the calyx indicates that this is not its relationship. Actually its closest ally seems to be *C. rosea* A. C. Sm., known only from Antioquia, but the differences between that species and *C. tryphera* are conspicuous, as mentioned in the above diagnosis. The new specific name refers to the delicate transparent texture of the calyx-limb.

Cavendishia chocoensis A. C. Sm. Amer. Journ. Bot. 27: 543. 1940.

COLOMBIA: El Valle: Río San Juan, left bank, quebradita opposite Palestina, alt. 0–5 m., *Cuatrecasas* 21236 (Ch).

The cited collection, although in fruit, precisely matches the type of this very distinct species, of which it is the second known collection. The fruits are said to be dark blue and 8–10 mm. in diameter, although on the dried specimen they appear to be only half that size.

Cavendishia dichroa A. C. Sm. sp. nov.

Arbor parva *C. pubescenti* (H. B. K.) Hemsl. affinis, habitu subglabro, petiolis brevioribus, foliorum laminis oblongo-lanceolatis angustioribus glabris vel subglabris paucinerviis basi truncatis vel rotundatis, inflorescentiae bracteis et rhachi glabris, calycis lobis angustioribus et sinibus rotundatis differt.

Small tree, the branchlets slender, obtusely angled, pale-puberulent, soon glabrescent; petioles rugulose, 3–6 mm. long, sparsely puberulent or short-pilose and glabrescent; leaf-blades coriaceous, oblong-lanceolate, 9–13 cm. long, 2–3 cm. broad, truncate or rounded at base, gradually narrowed to a sharp acumen 1–2 cm. long, narrowly revolute at margin, glabrous on both sides or faintly pilose along the costa proximally, scattered-glandular-punctate beneath with minute brownish hairs, 5-nerved, the costa impressed above, prominent beneath, the inner pair of secondary nerves concurrent with costa for 0.5–2 cm., ascending, comparatively inconspicuous, the outer pair short and indistinct, the veinlets usually immersed; inflorescence axillary or terminal, compact, short-racemose, many-flowered, enveloped by numerous imbricate circumscribing and flower-subtending bracts, these papyraceous, glabrous (or the outermost ones sparsely puberulent dorsally), scariose-margined, the largest (innermost) ones elliptic, about 25 mm. long and 15 mm. broad; rachis hardly 1 cm. long at anthesis, glabrous; pedicels terete, glabrous or sparsely puberulent, about 1 cm. long at anthesis, deciduously bibracteolate near base (bracteoles oblong, about 2 mm. long, essentially glabrous); calyx cupuliform, about 6 mm. long, the tube densely pilose with spreading white hairs about 0.3 mm. long, the limb erect, about 3 mm. long including lobes, less densely pilose than the tube, the lobes narrowly deltoid, 1–1.5 mm. long, margined by linear glands, the sinuses

rounded; corolla cylindric, 22–24 mm. long at anthesis, slender (about 4 mm. in diameter), copiously pilose like the calyx, the lobes deltoid, obtuse, about 1.5 mm. long; stamens about 17 mm. long, the filaments loosely coherent at base, distally pilose, alternately about 3 mm. and 6 mm. long, the anthers alternately about 15 mm. and 12 mm. long, the thecae 4–5 mm. long, the tubules about twice as long as the thecae; style filiform, exserted at anthesis, the stigma subcapitate.

Type in the U. S. National Herbarium, No. 1952284, collected on creek margin, Alto de Santa Elena, near Medellín, Department of Antioquia, Colombia, alt. 2,500 meters, in December 1948, by L. Uribe Uribe (No. 1855).

Although *C. pubescens* (H. B. K.) Hemsl. is usually construed as a highly variable species, it can hardly be interpreted to include such a narrow-leaved and inconspicuously pilose entity as described above. In its foliage and in details of its calyx, *C. dichroa* seems sufficiently different from typical *C. pubescens* to merit specific recognition. According to the collector, *C. dichroa* is a densely foliaged small tree, with highly colored bracts and a bicolored white and rose corolla. The leaves have the texture and sometimes the metallic sheen often found in *C. pubescens*.

Cavendishia durifolia A. C. Sm. Contr. U. S. Nat. Herb. **28**: 493. 1932.

COLOMBIA: Tolima: Between El Libano and Murillo (Kilometers 11 to 22 of the highway), subpáramo at Alto de Peñones, alt. 2,200–2,950 m., *Garcia-Barriga* 12280 (US), 12284 (US).

The cited specimens, the second and third of the species known to me, are from essentially the type locality. They differ from the type only in minor characters; for instance, the pedicels are shorter, being only about 2 mm. in length, and the calyx-tube, so peculiarly elongated in the type, is here more nearly normal for the genus, being often 4–5 mm. long but still more variable than usual in *Cavendishia*. In leaf shape, inflorescence pubescence, flower size, etc., the new material agrees closely with the type.

Cavendishia cryptantha A. C. Sm. sp. nov.

Frutex *C. guatapeensi* Mansf. affinis, foliorum laminis majoribus apice obtusioribus, nervis secundariis cum costa altius concurrentibus, inflorescentia longiore, pedicellis minus manifestis, calyce paullo majore, staminibus brevioribus, antherarum tubulis quam thecis plus minusve duplo longioribus differt.

Shrub, up to 2 m. high, glabrous throughout; branchlets brownish, striate, bluntly angled; petioles subterete, rugulose, often inconspicuous, 2–6 mm. long; leaf-blades coriaceous, olivaceous when dried, (4.5–) 7–9.5 cm. long, 2–4 cm. broad, narrowly subcordate or rounded at base, obtuse or obtusely cuspidate at apex, entire and narrowly recurved at margin, sometimes obscurely brownish-punctate beneath, 5–7-nerved, the costa slightly impressed above (raised proximally)

and elevated beneath, the inner pair of secondary nerves concurrent with costa for 1–3 cm., sharply ascending, nearly as prominent as the costa, the outer secondary nerves shorter, less conspicuous, the veinlet-reticulation coarse, slightly prominulous or immersed on both surfaces; inflorescences axillary, congested toward apices of branchlets, short-racemose, apparently 10–20-flowered (but the flowers crowded, the lower ones maturing and falling while the upper ones are in bud), circumscribed at base by a few small deltoid coriaceous bracts, the rachis stout, 2–4 cm. long (at or after full anthesis); flower-subtending bracts subcoriaceous, obovate-elliptic, 10–15 mm. long, 8–12 mm. broad, scarious at margin, involute and closely investing the individual flowers; flowers (pedicels, calyx, and corolla) minutely glandular when young with scattered superficial brownish glands; pedicels minute, stout, 1–2 mm. long, bibracteolate near middle, the bracteoles papyraceous, oblong, 5–6 mm. long, 2–3 mm. broad, subacute, margined with a few minute fine glandular hairs, closely appressed to calyx, caducous; calyx 6–7 mm. long, the tube cupuliform, the limb erect, papyraceous, about 3 mm. long, 5-lobed, the lobes deltoid, acute, 1–2 mm. long, the sinuses acute; corolla thin-carnose, cylindric-urceolate, at anthesis 9–10 mm. long and 3–4 mm. in diameter near middle, the lobes 5, minute, deltoid, subacute; stamens alternately about 5.5 mm. and 6.5 mm. long, the filaments ligulate, alternately about 1 mm. and 3 mm. long, the thecae nearly smooth, 1.5–2 mm. long, the tubules about twice as long as the thecae, dehiscing by elongate clefts; style filiform, about as long as the corolla, slightly swollen at apex; young fruit subglobose, 4–5 mm. in diameter, surmounted by the persistent calyx-limb and style.

Type in the U. S. National Herbarium, No. 1903202, collected in woods below the crest near Las Palmas, road between Medellín and El Retiro, Department of Antioquia, Colombia, alt. about 2,500 meters, October 18, 1946, by G. Gutiérrez V. (No. 1118).

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Antioquia: From precise type locality, *P. Falla B.* 14 (US). Woods below the crest near Santa Elena, road between Medellín and Río Negro, alt. about 2,300–2,500 m., *A. Gärtner N.* 63 (US). San Pedro, *Bro. Tomás* 762 (US).

The plant is described by its collectors as a shrub up to 2 meters in height, with purplish bracts and red flowers; Tomás records the local name "uvito." In its crowded flowers enveloped by subcoriaceous subpersistent bracts and other floral characters, *C. cryptantha* is closely related only to *C. guatapeensis* Mansf., differing as noted in the above diagnosis. The new specific name refers to the fact that the flowers are closely enveloped and hidden by the bracts, which persist after the corollas have fallen.

Cavendishia amoena A. C. Sm. sp. nov.

Frutex epiphyticus foliis parvis, inflorescentia compacta bracteis involuta, inflorescentiae partibus textura subtilibus distinguendus; a *C. angustifolia* Mansf. foliorum laminis lanceolato-ellipticis brevioribus pro portione latioribus apice rotundatis vel obtusis, floribus paullo majoribus, corolla puberula differt; a *C. dugandiana* A. C. Sm. foliorum forma et nervatione, floribus pluribus, pedicellis longioribus cum bracteolis eglandulosis, calyce glabro, corolla staminibusque longioribus facile distinguitur.

Epiphytic shrub, the branchlets slender, spreading, subterete, minutely but densely puberulent, glabrescent; petioles subterete, slender, rugulose, 2–3 mm. long, puberulent like the branchlets; leaf-blades subcoriaceous, olivaceous when dried, lanceolate-elliptic, (1.5–) 2–4 cm. long, (0.7–) 1–1.5 cm. broad, obtuse or narrowly rounded at base, rounded or obtuse and obscurely callose-apiculate at apex, narrowly recurved at margin, minutely puberulent on the costa above, obscurely dark-punctate beneath, 5-nerved from near base, the costa faintly impressed above and raised beneath, the inner pair of secondary nerves ascending, the outer pair short, obscure, the veinlet-reticulation prominulous above, nearly plane beneath; inflorescences axillary or subterminal, short-racemose, apparently 6–10-flowered, glabrous throughout (except corolla and filaments), bracteate at base, the outer bracts the smallest, papyraceous, broadly ovate, the inner bracts increasingly larger, membranaceous, translucent, broadly elliptic, up to 22 mm. long and 15 mm. broad, enveloping the inflorescence; rachis slender, elongating during anthesis and eventually 1–2 cm. long; pedicels slender, at anthesis 5–6 mm. long, swollen at apex, obscurely bibracteolate near base, the bracteoles elliptic, about 2 mm. long, evanescent; calyx about 3.5 mm. long and in apical diameter at anthesis, the tube about 1.5 mm. long, truncate and faintly apophysate at base, the limb erect, submembranaceous, 5-lobed, the lobes triangular, about 1 mm. long, thickened at apex and distally margined by pale linear glands; corolla submembranaceous, cylindric, about 15 mm. long and 4 mm. in diameter at anthesis, densely but very minutely white-puberulent without in the distal half, the lobes deltoid-oblong, subacute; stamens nearly as long as corolla, the filaments delicate, pale, alternately about 2 mm. and 3.5 mm. long, obscurely puberulent distally within, the anthers alternately about 13 mm. and 11 mm. long, the thecae nearly smooth, 3–4 mm. long, the tubules 2–3 times as long as the thecae, dehiscing by elongate clefts; style pale, filiform, subequal to corolla, the stigma obscurely peltate.

Type in the herbarium of the Arnold Arboretum, collected at quebradita at Kilometer 51, left side of Río San Juan in the region of Queremal, valley of Río Dígua, western slope of Western Cordillera, Department of El Valle, Colombia,

alt. 1,540–1,650 meters, February 25, 1947, by J. Cuatrecasas (No. 23713). Duplicate in the Chicago Natural History Museum.

The plant is said to be a spreading, branching, epiphytic shrub, with thin-coriaceous leaves which are dull dark green above and delicate bright green beneath; the bracts are dark violet and the corolla bright violet.

This attractive small-leaved species suggests only *C. angustifolia* Mansf. and *C. dugandiana* A. C. Sm., being readily distinguished from both by characters mentioned above.

Cavendishia strobilifera (H. B. K.) Hoer. Bot. Jahrb. Engler 42: 279. 1909.

Thibaudia ? acuminata Dun. in DC. Prodr. 7: 565. 1839.

A photograph of the type of Dunal's species (*Joseph de Jussieu*, Peru, in the Paris Herbarium) makes it possible to place this questioned entity, which clearly represents *C. strobilifera*. Dunal's binomial is both a later homonym and a synonym of *Thibaudia acuminata* Hook. (1837), the basonym of *Cavendishia acuminata* (Hook.) Hemsl., more correctly known as *C. strobilifera*, as discussed by the writer.[39]

Cavendishia haughtii A. C. Sm. sp. nov.

Frutex gracilis inflorescentiae bracteis caducis, floribus subviridibus, staminibus subisomorphis distinguitur; *C. strobiliferae* (H. B. K.) Hoer. et *C. splendenti* (Kl.) Hoer. affinis, foliorum forma, laminis in petiolum longe decurrentibus apice obtusis vel obtuse cuspidatis, bracteis floriferis obovatis angustioribus, corolla staminibusque brevioribus valde differt.

Slender shrub, about 2 m. high, the branchlets terete, glabrous; petioles rugulose, stout, 5–10 mm. long; leaf-blades subcoriaceous, dark-olivaceous when dried, elliptic, 7.5–9.5 cm. long, 4–5 cm. broad, narrowed at base and abruptly long-decurrent on the petiole, obtuse or obtusely short-cuspidate at apex, inconspicuously recurved at margin, glabrous above, inconspicuously glandular beneath with minute appressed brownish hairs, 5- or obscurely 7-nerved, the secondary nerves ascending (inner ones concurrent with costa for about 1 cm.), like the costa prominulous above and conspicuously elevated beneath, the veinlet-reticulation obscurely raised on both surfaces; inflorescences axillary, glabrous throughout, short-racemose, about 8-flowered, marked at base by the scars of a few caducous bracts, the rachis slender, rugulose, about 1.5 cm. long; flower-subtending bracts membranaceous, narrowly obovate, 13–20 mm. long, 5–7 mm. broad, rounded at apex, gradually narrowed toward base, sparsely ciliolate at margin, inconspicuously nerved, soon caducous; pedicels terete, at anthesis

[39] Bull. Torrey Club 63: 313. 1936.

7–11 mm. long, enlarged distally, bearing toward the base two membranaceous lanceolate ciliolate bracteoles 2–2.5 mm. long, these readily caducous; calyx 4.5–5 mm. long and about 5 mm. in apical diameter, the tube short-cylindric, 2–2.5 mm. long, 2.5–3.5 mm. in diameter, truncate at base, rugulose when dried, the limb submembranceous, suberect, slightly longer than the tube, the lobes 5, deltoid, about 1.5 mm. long and 2–3 mm. broad, acute and slightly thickened at apex, the sinuses rounded; corolla thin-carnose or submembranaceous, cylindric, slightly before anthesis about 12 mm. long and 5 mm. in diameter, contracted at both ends, the lobes 5, small, oblong-deltoid, obtuse; stamens 10, subsimilar, nearly as long as the corolla, the filaments membranaceous, alternately about 2.5 mm. and 3 mm. long, slightly connate at base, minutely ciliolate distally, the anthers 9.5–10 mm. long, the thecae 2.5–3 mm. long, incurved at base, the tubules 2–3 times longer than the thecae, with elongate clefts; style filiform, subequal to the corolla, the stigma minutely peltate.

Type in the U. S. National Herbarium, No. 1709073, collected in forest along a sharp ridge 25 km. southwest of Carraipia, Comisaría Guajira, Colombia, alt. 750 meters, August 26, 1944, by O. Haught (No. 4333).

The collector notes that only one plant was seen, this being apparently a slender arching shrub 2 m. high, with greenish flowers. The specimen described above is the first member of the genus from the Comisaría Guajira, in extreme northeastern Colombia, which has come to my attention. It represents an obviously undescribed species without close allies, being unusual in *Cavendishia* because of its nearly isomorphic stamens. In all other characters it is typical of the genus, and upon careful examination one may observe that the alternate filaments are slightly different in respect to their length and breadth.

Orthaea peregrina A. C. Sm. sp. nov.

Planta ab omnibus speciebus generis calycis limbo irregulariter fisso, corolla pilis longis glanduliferis dense induta, filamentis connatis valde differt.

Large shrub, the vegetative parts glabrous, the branchlets stout, striate, brownish; petioles rugulose, deeply sulcate above, 4–6 mm. long; leaf-blades coriaceous, brownish green when dried, oblong-lanceolate, 6–8 cm. long, 2–3 cm. broad, obtuse at base and decurrent on the petiole, tapering to an acuminate apex 1–1.5 cm. long, entire and slightly recurved at margins, inconspicuously scattered-reddish-glandular beneath, 5-nerved from base (outermost nerves obscure), the costa and inner pair of nerves faintly impressed above, elevated beneath, the veinlets immersed; inflorescences axillary toward apices of branchlets, racemose, 10–15-flowered, circumscribed at base by a few papyraceous suborbicular bracts, the largest (innermost) bracts about 8 mm. long,

the outer ones much smaller; rachis rugulose, 3.5–4.5 cm. long, floriferous to base, bearing scattered reddish gland-tipped hairs 0.3–0.5 mm. long; flower-subtending bracts submembranaceous, oblong-lanceolate, about 10 mm. long and 2 mm. broad, sparsely margined with stalked glandular hairs, readily caducous; pedicels similar to rachis in texture and indument, stout, 18–34 mm. long, conspicuously enlarged upward and nearly pulvinate below the conspicuous calyx-articulation, bibracteolate near base, the bracteoles similar to the flower-subtending bracts but about 5 mm. long; calyx subcampanulate, at anthesis 12–13 mm. long and about 10 mm. in apical diameter, the tube about 3 mm. long, the limb apparently thin-carnose, much longer than the tube, sparsely glandular-hispidulous without like the pedicels, irregularly cleft into 5 lobes, these deltoid, 2–6 mm. long, 3–4 mm. broad, often partially united in pairs, acute, slightly thickened at margins, the sinuses acute; corolla thin-carnose, cylindric, 19–21 mm. long and about 7 mm. in diameter at anthesis, distally narrowed, densely covered without in the distal two-thirds with spreading stout pale gland-tipped hairs 2–3 mm. long, glabrous within, the lobes 5, deltoid-oblong, subacute, about 2 mm. long; stamens 10, about half as long as the corolla, alternately unequal, the filaments membranaceous, laterally connate for nearly their entire length, alternately 5–6 mm. and 6–7 mm. long, densely puberulent distally within, the anthers similar, 4–4.5 mm. long, the thecae finely granular, the tubules about as long as the thecae, dehiscing by introrse-apical oval pores about 1 mm. long; style nearly as long as corolla, slender, the stigma obscurely peltate.

Type in the herbarium of the Arnold Arboretum, collected at Mina El Diamante, Quebrada del Ratón, northwestern slope of Los Farallones, Western Cordillera, Department of El Valle, Colombia, alt. 2,950–3,000 meters, July 30, 1946, by J. Cuatrecasas (No. 21771). Duplicate in the Chicago Natural History Museum.

The plant is said to be a very large shrub, more or less epiphytic, with climbing branches; the leaves are rigidly coriaceous, dark green above and bright yellowish green beneath; the pedicels and calyces are shining red, and the corolla whitish pink.

As a result of Dr. Cuatrecasas's collections from the Western Cordillera of Colombia, many spectacular new species have been discovered. The present plant is one of the most striking which has come to my attention, presenting combinations of characters not otherwise found in the Vacciniaceae. Consequently I refer it to a genus with hesitation. Its basic characters, such as the alternately unequal filaments and the short isomorphic anthers with subapically dehiscing tubules, point to *Orthaea*; but the described species of that genus have the filaments distinct or essentially so. Other striking characters of the new species are the irregularly splitting calyx-limb and the extraordinary pubescence of the corolla. The corolla-hairs are of a type which

I have not previously noted in the tropical American Vacciniaceae; they are thin-walled, distally tapering, and multicellular, with the cells in 2–4 longitudinal rows, and with large ellipsoid apical glands.

Satyria latifolia A. C. Sm. Contr. U. S. Nat. Herb. 28: 527. 1932.

COLOMBIA: Norte de Santander: Sarare region, Alto de Santa Inés, alt. 2,150–2,250 m., *Cuatrecasas, Schultes, & E. Smith* 12422 (Ch, US).

This species has previously been known only from the type, collected in the Department of Bolívar. Although both collections are incomplete and not entirely satisfactory, in foliage and floral characters they are essentially identical. The inflorescence and pedicels of No. 12422 (lacking in the type) may be described as follows:

Inflorescences borne on the stout branchlets below leaves, short-racemose, 4–15-flowered, the rachis stout, 8–17 mm. long, glabrous, the flowers subtended by deltoid bracts about 2 mm. long; pedicels stout, apparently subcarnose and flattening under pressure, 20–40 mm. long at anthesis, obscurely and deciduously bibracteolate near middle.

Satyria leptantha A. C. Sm. Journ. Arn. Arb. 27: 119. 1946.

COLOMBIA: El Valle: Western slope of Western Cordillera, valley of Río Dígua, left side of Río San Juan in the region of Queremal, quebradita of Kilometer 51, alt. 1,350–1,400 m., *Cuatrecasas* 23706 (A, Ch).

The second collection of the species, from the same region as the type, agrees with it precisely. The plant is a large epiphytic shrub with rigidly coriaceous bright green leaves; the pedicels, calyces, and lower two-thirds of the corolla are red, while the apex of the corolla is white.

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CONTRIBUTIONS

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NEW GRASSES FROM MEXICO CENTRAL AMERICA, AND SURINAM

By JASON R. SWALLEN

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BULLETIN OF THE UNITED STATES NATIONAL MUSEUM

PREFACE

In the present paper, by Jason R. Swallen, curator of the division of grasses, United States National Herbarium, 48 new species are described and 2 new names proposed. They are based mainly on recent collections from Mexico and Guatemala, the types being deposited in either the National Herbarium or the Chicago Natural History Museum.

E. P. Killip,

Head Curator, Department of Botany,
United States National Museum.

852599—50——1

NEW GRASSES FROM MEXICO, CENTRAL AMERICA, AND SURINAM

By Jason R. Swallen

Most of the following new species are from Guatemala and are described from the collections of Julian A. Steyermark, Paul C. Standley, A. F. Skutch, S. F. Blake, H. Pittier, and Paul Weatherwax. The rest were collected by F. G. Meyer and D. J. Rogers, Efraim Hernández X. and J. A. Jenkins, George B. Hinton, William C. Leavenworth, A. J. Sharp, and H. E. Moore in Mexico; C. L. Lundell in British Honduras; Louis O. Williams and Antonio Molino R. in Honduras; and Bassett Maguire in Surinam. There are 48 new species and 2 new names proposed.

BROMUS MEYERI Swallen, sp. nov.

Perennis; culmi graciles, erecti, basi decumbentes, 70–115 cm. alti, 3- vel 4-nodosi, infra nodos pubescentes; vaginae internodiis longiores, dense pilosae, auriculatae; ligula membranacea, 0.4 mm. longa; laminae 15–25 cm. longae, 2–3 mm. latae, dense pubescentes; paniculae 10–15 cm. longae, pendulae, ramis fasciculatis, distantibus, reflexis, paucifloris; spiculae 1.5–2 cm. longae, 3- vel 4-florae; gluma prima 5–6 mm. longa, angusta, 1-nervis, in carina scabra; gluma secunda 6.5–8 mm. longa, obtusa, 3-nervis, in carina scabra; lemma 8–9.5 mm. longum, 5-nerve, obtusum, in parte inferiore pubescens; arista scabra, 1–3 mm. longa; palea lemmate paulo brevior, in carinis scabra.

Perennial; culms slender, erect from an ascending base, 70–115 cm. tall, with 3 or 4 nodes, pubescent below the nodes, otherwise glabrous; sheaths mostly longer than the internodes, densely pilose with spreading or retrorse hairs, with small but distinct auricles at the mouth; ligule membranaceous, brown, 0.4 mm. long; blades 15–25 cm. long, 2–3 mm. wide, rather densely pubescent on both surfaces; panicle 10–15 cm. long, nodding, the branches in rather distant fascicles, few-flowered, becoming reflexed; spikelets 1.5–2 cm. long, 3- or 4-flowered; first glume 5–6 mm. long, narrow, acuminate, 1-nerved, scabrous on the keel; second glume 6.5–8 mm. long, obtuse, strongly 3-nerved, scabrous on the keel; lemmas 8–9.5 mm. long, 5-nerved, obtuse,

pubescent at least on the lower half, bearing a scabrous awn 1–3 mm. long; palea shorter than the lemma, scabrous on the keels.

Type in the U. S. National Herbarium, No. 1962983, collected among low thorny shrubs on north hillside, 1½ miles northeast of Dulces Nombres, Nuevo León, Mexico, altitude 1,850 meters, June 18, 1948, by F. G. Meyer and D. J. Rogers (No. 2561).

Only one other known species of *Bromus*, *B. latiglumis* (Shear) Hitchc., has auricles at the mouth of the sheaths. This species is very distinct from the one described in the many-noded culm, broad blades, and the very densely and conspicuously pubescent lemmas. The auricles are also much larger.

BROMUS DENSUS Swallen, sp. nov.

Perennis; culmi densissime caespitosi, erecti, 110 cm. alti, infra nodos scabri; vaginae internodiis elongatis multo breviores, scabrae, inferiores fibrosae; ligula membranacea, erosa, 0.5 mm. longa; laminae lineares, attenuatae, scaberrimae, inferiores usque ad 25 cm. longae, 2–3 mm. latae, basi marginibus prominente pilosae, eae culmorum 13–17 cm. longae, basi plus minusve ciliatae; panicula 9.5 cm. longa, 2 cm. lata, densa, ramis scaberrimis, appressis; spiculae 2 cm. longae, 4-florae; rachilla dense hirsuta; gluma prima 6–7 mm. longa, angusta, acuminata, 1-nervis, in carina scabra; gluma secunda 9–11 mm. longa, 3-nervis, acuminata, scabra; lemma 12–13.5 mm. longum, acuminatum, 3-nerve, in parte inferiore dense hirsutum, in parte superiore subglabrum; arista 1–1.5 mm. longa; palea acuminata, lemma subaequans, marginibus hirsuta, in carinis dense breviter ciliata.

Perennial; culms very densely tufted, erect, 110 cm. tall, soft, scabrous below the nodes; sheaths, except the basal ones, all much shorter than the elongate internodes, scabrous, the old basal sheaths becoming conspicuously fibrous; ligule an erose membrane 0.5 mm. long; blades linear, attenuate, very scabrous, the basal ones as much as 25 cm. long, 2–3 mm. wide, rather prominently pilose near the margins toward the base, those of the culm 13–17 cm. long, more or less ciliate near the base; panicle 9.5 cm. long, 2 cm. wide, dense, the very scabrous branches appressed; spikelets about 2 cm. long, 4-flowered, the rachilla segments densely hirsute; first glume 6–7 mm. long, narrow, acuminate, 1-nerved, scabrous on the keel; second glume 9–11 mm. long, 3-nerved, acuminate, scabrous; lemma 12–13.5 mm. long, acuminate, 3-nerved, densely hirsute on the lower half, the upper glabrous or nearly so, bearing an awn 1–1.5 mm. long; palea acuminate, about as long as the lemma, the margins hirsute, the keels shortly but rather densely ciliate.

Type in the U. S. National Herbarium, No. 1962994, collected in open pine forest, Cerro del Viejo, 15 miles west of Dulces Nombres, Municipality Zaragoza, Nuevo León, Mexico, altitude 3,330 meters, August 18, 1948, by F. G. Meyer and D. J. Rogers (No. 2976).

BROMUS ATTENUATUS Swallen, sp. nov.

Perennis; culmi caespitosi, erecti, 1 m. alti, glabri; vaginae superiores glabrae val scabrae, in ore pilosae, internodiis breviores, inferiores dense pubescentes, internodiis longiores; ligula membranacea, 0.4 mm. longa; laminae usque ad 60 cm. longae, 8–16 mm. latae, tenues, attenuatae, basi angustae, scabrae; paniculae 18 cm. longae, pendulae ramis gracilibus, scabris, 1- vel 2-spiculatis; spiculae 2–2.8 mm. longae, 5- vel 6-florae; gluma prima 6.5–7.5 mm. longa, 1-nervis, acuminata, in carina scabra; gluma secunda prima paulo longior, 3-nervis, obtusa, in carina scabra; lemma 12–13 mm. longum, 3-nerve, acutum, glabrum, arista scabra 2–3 mm. longa praeditum; palea lemmate paulo brevior.

Perennial; culms tufted, erect, 1 m. tall, glabrous; sheaths glabrous, or scabrous, or the lower ones densely pubescent, somewhat hairy at the mouth, the lower longer, the upper shorter than the internodes; ligule membranaceous, 0.4 mm. long; blades as much as 60 cm. long, 8–16 mm. wide at the middle, thin, attenuate, gradually narrowed to the base, scabrous especially on the margins; panicle drooping, 18 cm. long, the slender scabrous branches bearing 1 or 2 spikelets; spikelets 2–2.8 mm. long, 5- or 6-flowered; first glume 6.5–7.5 mm. long, 1-nerved, acuminate, scabrous on the keel; second glume a little longer than the first, 3-nerved, obtuse, scabrous on the keel; lemmas 12–13 mm. long, 3-nerved, acute, glabrous, with a scabrous awn 2–3 mm. long; palea a little shorter than the lemma.

Type in the U. S. National Herbarium, No. 1962991, collected in rich humus on ledges above dry stream in canyon on east side of Cerro Linadero, Dulces Nombres, Neuvo León, Mexico, altitude 1,900 meters, August 11, 1948, by F. G. Meyer and D. J. Rogers (No. 2937).

Both *Bromus densus* and *B. attenuatus* are exceptional in having 3-nerved lemmas.

FESTUCA PINETORUM Swallen, sp. nov.

Perennis; culmi dense caespitosi, erecti, 38–55 cm. alti, glabri, uninodosi; vaginae scaberulae, eae culmorum elongatae, breviter auriculatae; ligula 0.4 mm. longa; laminae convolutae, 5–10 cm. longae, scaberulae; paniculae 6–12 cm. longae, ramis distantibus appressis, inferioribus usque ad 4.5 cm. longis; spiculae breviter pedicellatae, appressae, 2- vel 3-florae; glumae acutae, 1-nerves, prima 2.4–2.5 mm. longa, secunda latior, 3 mm. longa; lemmata 4.5–5 mm. longa, acuta, summo scabra, exaristata vel arista 1 mm. longa praedita; palea lemma aequans, in carinis sparse scabra; antherae 2 mm. longae.

Perennial; culms densely tufted, erect, 38–55 cm. tall, glabrous, 1-noded; leaves mostly crowded at the base; sheaths scaberulous, those of the culm elongate, extending into small lobes at the summit; ligule 0.4 mm. long between the lobes of the sheath; blades convolute, 5–10 cm.

long, scaberulous; panicles 6–12 cm. long, the branches rather distant, appressed, the lower as much as 4.5 cm. long; spikelets short-pedicellate, appressed, 2- or 3-flowered; glumes acute, 1-nerved, the first 2.4–2.5 mm. long, the second broader, 3 mm. long; lemmas 4.5–5 mm. long, acute, scabrous toward the summit, bearing an awn about 1 mm. long, or rarely awnless; palea as long as the lemma, sparsely scabrous on the keels; anthers 2 mm. long.

Type in the U. S. National Herbarium, No. 1962995, collected in open pine forest, Cerro del Viejo, 15 miles west of Dulces Nombres, Municipality Zaragoza, Nuevo León, Mexico, altitude 3,330 meters, August 18, 1948, by F. G. Meyer and D. J. Rogers (No. 2977).

FESTUCA BREVIGLUMIS Swallen, sp. nov.

Perennis; culmi erecti, 55 cm. alti; vaginae glabrae, inferiores fibrosae; ligula membranacea, 0.1 mm. longa; laminae planae, elongatae, attenuatae, 5–8 mm. latae, marginibus scabrae; panicula 21 cm. longa, laxa, ramis binis distantibus, plus minusve flexuosis; spiculae 2 cm. longae, 4-florae; glumae acutae vel subacuminatae, prima 3–5 mm. longa, 1-nervis, secunda 4–9 mm. longa, 3-nervis; lemma primum 14–17 mm. longum, attenuatum, scabrum, arista 8–13 mm. longa, scabra praeditum; palea ca. 1 cm. longa, scabra; rachilla hirsuta.

Perennial; culms erect, 55 cm. tall; sheaths glabrous, the lowermost becoming fibrous with age; ligule a very short membrane less than 0.1 mm. long; blades flat, attenuate, 5–8 mm. wide, scabrous on the margins, otherwise glabrous; panicles 21 cm. long, lax, drooping, the branches somewhat flexuous, paired, the pairs distant; spikelets mostly 4-flowered, 2 cm. long, excluding the awns; glumes acute or subacuminate, the first 3–5 mm. long, 1-nerved, the second 4–9 mm. long, 3-nerved; lowest lemma 14–17 mm. long, attenuate, scabrous, the awn 8–13 mm. long; palea about 1 cm. long, finely scabrous; rachilla appressed hirsute.

Type in the U. S. National Herbarium, No. 1307123, collected in dense oak and bamboo forest near Laguna de la Escuadra, northeast of El Copey, altitude 2,000–2,200 meters, Provincia de San José, Costa Rica, December 16, 1925, by Paul C. Standley (No. 41998).

This species is related to *Festuca chiriquiensis* Swallen, which differs in having longer subequal glumes and short-awned lemmas, the awns 1–3 mm. long.

Also collected in Guatemala, above Las Calderas, region of Los Positos, Department of Chimaltenango, *Standley* 80130. In this collection the first glumes are somewhat shorter than those of the type, and some of the culms are as much as a meter high with an inflorescence as much as 30 cm. long.

POA VENOSA Swallen, sp. nov.

Perennis; culmi erecti, 50–70 cm. alti; vaginae glabrae, internodiis breviores; ligula 1 mm. longa; laminae 3–8 cm. longae, 2–4 mm. latae, glabrae; paniculae 10–13 cm. longae, ramis binis anguste adscendentibus vel inferioribus patentibus, plus minusve flexuosis, in parte inferiore nudis, infimo usque ad 5 cm. longo; spiculae 2- vel 3-florae, 4–5 mm. longae, viridi-purpureae; glumae acutae, prima 2–3 mm. longa, 1-nervis, secunda latior, 2.5–3 mm. longa, 3-nervis; lemma primum 3.5 mm. longum, acutum, in parte inferiore dense pubescens.

Perennial; culms erect, 50–70 cm. high; sheaths mostly shorter than the internodes, glabrous; ligule 1 mm. long; blades 3–8 cm. long, 2–4 mm. wide, glabrous; panicle 10–13 cm. long, the scabrous branches usually in pairs, rather narrowly ascending or the lower ones spreading, more or less flexuous, naked below, the lowermost as much as 5 cm. long; spikelets 2- or 3-flowered, 4–5 mm. long, greenish-purple; glumes acute, the first 2–3 mm. long, 1-nerved, the second a little broader, 2.5–3 mm. long, 3-nerved; first lemma 3.5 mm. long, acute, densely pubescent on the lower half, with a prominent cobweb at the base.

Type in the U. S. National Herbarium, No. 1935067, collected in alpine meadow, vicinity of Chémal, summit of Sierra de los Cuchumatanes, altitude 3,700–3,750 meters, Department of Huehuetenango, Guatemala, August 8, 1942, by Julian A. Steyermark (No. 50310).

POA TACANAE Swallen, sp. nov.

Perennis, rhizomatosa; culmi erecti, ca. 30 cm. alti; vaginae internodiis longiores, laeves, lucidae; ligula truncata, 1 mm. longa; laminae planae, laxae, 10–15 cm. longae, 1–2 mm. latae, summo scabrae; panicula ca. 9 cm. longa, ramis gracilibus, subglabris, paucifloris, in parte inferiore nudis; spiculae 2-florae; glumae angustae, acuminatae vel subacuminatae, prima 1.8–2 mm. longa, secunda 2.5 mm. longa; lemma primum 4 mm. longum, acutum, summo nervis scabrum.

Perennial with creeping rhizomes; culms erect, about 30 cm. high; sheaths all longer than the internodes, smooth and shining; ligule truncate, not more than 1 mm. long; blades flat, lax, mostly 10–15 cm. long, 1–2 mm. wide, scabrous toward the tip, especially on the underside of the midnerve and on the margins; panicle about 9 cm. long, the slender nearly glabrous branches flexuous, few-flowered, naked below; spikelets 2-flowered; glumes narrow, acuminate or subacuminate, lunate, the first 1.8–2 mm. long, the second 2.5 mm. long; first lemma 4 mm. long, gradually narrowed from the base, acute, scabrous at least on the nerves at the tip, otherwise glabrous.

Type in the Chicago Natural History Museum, No. 1059917, collected on wooded lower slopes, between Sibinal and summit of Volcán Tacana, altitude 2,500–4,400 meters, Department of San Marcos, Guatemala, February 19, 1940, by Julian A. Steyermark (No. 36083).

Related to *Poa seleri* Pilger, which differs in having subobtuse lemmas not more than 3 mm. long, shorter and broader glumes, a rather prominent ligule mostly 2–3 mm. long, and scabrous panicle branches.

POA SHARPII Swallen, sp. nov.

Perennis; culmi erecti basi adscendentes, 45 cm. alti, compressi, scaberuli; vaginae internodiis breviores, compressae, carinatae, glabrae; ligula brevissima; culmorum laminae 5–8 cm. longae, 2 mm. latae, glabrae, eae innovationum elongatae; panicula 11 cm. longa, laxa, ramis solitariis vel binatis, distantibus, flexuosis, in parte inferiore nudis; spiculae 4 mm. longae, 3-florae; glumae acutae, prima angusta, 1.7 mm. longa, 1-nervis, secunda 2.3 mm. longa, 3-nervis; lemma primum 2.8 mm. longum, subobtusum, in carina et nervis lateralibus basin versus pubescens, basi lanatum.

Perennial; culms erect from a slender ascending base, 45 cm. high, distinctly flattened, scaberulous; sheaths shorter than the internodes, compressed, keeled, glabrous; ligule very short; culm blades 5-8 cm. long, 2 mm. wide, glabrous, those of the innovations elongate; panicle 11 cm. long, lax, the slender, distant, flexuous branches solitary or in pairs, naked below; spikelets 4 mm. long, 3-flowered; glumes acute, the first narrow, 1-nerved, 1.7 mm. long, the second broader, 3-nerved, 2.3 mm. long; first lemma 2.8 mm. long, subobtuse, pubescent on the keel and marginal nerves toward the base, with a rather prominent cobweb.

Type in the U. S. National Herbarium, No. 1939432, collected on moist shaded soil near El Puerto, Veracruz, Mexico, altitude 7,700 feet, September 6, 1944, by A. J. Sharp (No. 44688).

Apparently allied to *Poa saltuensis* Fern. & Wieg. of the Eastern United States, this species differs in having smaller spikelets and the lemmas pubescent on the keel and lateral nerves below.

POA FILICULMIS Swallen, sp. nov.

Perennis; culmi erecti, dense caespitosi, gracillimi, glabri, uninodosi; vaginae aggregatae, glabrae; ligula tenuis, 0.3 mm. longa; laminae 4–8 cm. longae, involutae, firmae, scabrae; paniculae 2.5–3 cm. longae, ramis inferioribus binatis, divaricatis, gracilibus, scaberulis, 1- vel 2-spiculatis; spiculae 2-florae; glumae latae, acutae vel subacutae, prima 2 mm. longa, 1-nervis, secunda 2.5 mm. longa, 3-nervis; lemmata 1.8 mm. longa, acuta, nervis minute scabra.

Perennial; culms erect in very dense tufts, 20–22 cm. high, very slender, glabrous, with 1 culm node near the base; sheaths crowded, glabrous; ligule thin, 0.3 mm. long; blades mostly 4–8 cm. long, involute, firm, scabrous; panicles 2.5–3 cm. long, the lower branches paired, horizontally spreading, slender, scaberulous, bearing 1 or 2 spikelets at the tip; spikelets 2-flowered; glumes broad, acute or subacute, the first 2 mm. long, 1-nerved, the second 2.5 mm. long, 3-nerved; lemmas 1.8 mm. long, acute, minutely scabrous on the nerves.

Type in the U. S. National Herbarium, No. 1815803, collected on valley floor sparsely covered by *Yucca* and *Larrea*, 15 kilometers west of Concepción del Ora, just within the border of Coahuila, Mexico, altitude 2,300 meters, July 19, 1941, by L. R. Stanford, K. L. Retherford, and R. D. Northcraft (No. 477).

This species is apparently most closely related to *Poa involuta* Hitchc. It is easily recognized by the short dense tufts and very slender culms with small few-flowered panicles.

BOUTELOUA DISTANS Swallen, sp. nov.

Perennis; culmi erecti, 38–60 cm. alti, glabri; vaginae internodiis longiores, sparse vel dense papilloso-villosae; ligula ciliata, ca. 1 mm. longa; laminae 7–15 cm. longae, 1.5–3.5 mm. latae, planae, attenuatae, marginibus scabrae; inflorescentiae 12–19 cm. longae; racemi 20-±50, 8–15 mm. longi, purpurei, reflexi, 1–3-spiculati; spiculae 8–9 mm. longae, distantes; glumae 1–nerves, in carina scabrae, prima acuminata spicula ½ brevior, secunda latior, subacuminata, spiculam subaequans; lemma angustum, acuminatum, exaristatum, glabrum; rudimentum 2 mm. longum, angustum, lemma subaequans.

Perennial; culms erect, 38–60 cm. tall, glabrous; sheaths all longer than the internodes, sparsely to densely papillose-villous; ligule ciliate, about 1 mm. long; blades 7–15 cm. long, 1.5–3.5 mm. wide, flat, attenuate, becoming curled with age, finely scabrous on the margins; inflorescence 12–19 cm. long, the axis attenuate pointed beyond the uppermost raceme; racemes 20 to about 50; 8–15 mm. long, purple, reflexed, bearing 1–3 relatively distant spikelets, the rachis narrow, scabrous, produced beyond the spikelets; spikelets 8–9 mm. long; glumes 1–nerved, finely scabrous on the keel, the first narrow, acuminate, half as long as the spikelet, the second broader, subacuminate, nearly as long as the spikelet; lemma narrow, acuminate, awnless, glabrous; rudiment 2 mm. long, narrow, glabrous, the awns equaling or somewhat exceeding the lemma.

Type in the U. S. National Herbarium, No. 1961989, collected about 170 kilometers north of Oaxaca, Oaxaca, Mexico, December 13, 1945, by E. Hernández X. and J. A. Jenkins (No. X–808).

The aspect of this species is similar to *Bouteloua curtipendula* (Michx.) Torr., but it is readily distinguished by the more slender, fewer-flowered racemes, narrower rachis, and the distant spikelets.

AGROSTIS VINOSA Swallen, sp. nov.

Perennis; culmi caespitosi, erecti, 9–26 cm. alti, uninodosi; laminae basi aggregatae, firmae, rigidae, arcuatae, involutae, scabrae, 1–4 cm. longae; ligula 1–2 mm. longa, decurrens; paniculae 3–10 cm. longae, purpureae, ramis gracilibus, appressis, 2–4 fasciculatis, supra medium floriferis, inferioribus usque ad 4 cm. longis; spiculae 2.5–3 mm. longae; glumae inaequales, acutae vel acuminatae, in carina scabrae; lemma 1.6–1.8 mm. longum, truncatum, arista 2 mm. longa, recta, scabra, supra basin ¼ inserta praeditum, calli marginibus breve barbatum; palea obsoleta; antherae 1.2–1.3 mm. longae.

Perennial; culms tufted, erect, 9–26 cm. high, with only one node evident above the base; leaves mostly crowded at the base, the blades firm, stiff, mostly arcuate, 1–4 cm. long, involute, scabrous; ligule 1–2 mm. long, decurrent; panicles 3–10 cm. long, dark purple, the slender scabrous branches appressed, in fascicles of 2–4, rarely with short branches intermixed, usually spikelet-bearing well above the middle, the lower ones as much as 4 cm. long; spikelets 2.5–3 mm. long; glumes unequal, acute or acuminate, scabrous on the keel; lemma 1.6–1.8 mm. long, truncate, awned, the awn inserted one-fourth above the base, about 2 mm. long, scabrous, straight or nearly so, the callus bearded on the sides with short hairs; palea wanting; anthers 1.2–1.3 mm. long.

Type in the U. S. National Herbarium, No. 1914772, collected in alpine meadow, vicinity of Chémal, summit of Sierra de los Cuchumatanes, altitude 3,700–3,750 meters, Department of Huehuetenango, Guatemala, August 8, 1942, by Julian A. Steyermark (No. 50290).

This species is clearly closely related to *A. tolucensis* H. B. K., which differs in having a dense panicle, most of the branches spikelet-bearing nearly to the base with short branches intermixed, slightly smaller spikelets, glabrous callus, and shorter anthers about 0.8 mm. long.

AGROSTIS LAXISSIMA Swallen, sp. nov.

Perennis; culmi graciles, debiles, decumbentes, 50–60 cm. longi; vaginae internodia aequantes, glabrae; ligula 3–4 mm. longa, decurrens; laminae planae, laxae, 8–15 cm. longae, 1–3 mm. latae, glabrae; paniculae 7–8 cm. longae, pauciflorae, ramis gracilibus, scabris, adscendentibus vel divergentibus, flexuosis, in parte inferiore nudis; spiculae 2 mm. longae; glumae aequales, acutae, in carina scabrae; lemma 1.5 mm. longum, tenue, truncatum, arista 3 mm. long, supra basin ⅓ inserta, curvata praeditum, calli marginibus breve barbatum; palea minuta; antherae 0.5 mm. longae.

Perennial; culms slender, weak, apparently decumbent spreading, 50–60 cm. long; sheaths about as long as the internodes or a little shorter, glabrous: ligule 3–4 mm. long. decurrent; blades flat, lax, mostly 8–15 cm. long, 1–3 mm. wide, glabrous; panicles 7-8 cm. long, open, relatively few-flowered, the slender, sparsely scabrous branches ascending or spreading, somewhat flexuous, naked in the lower half; spikelets 2 mm. long; glumes equal, acute, scabrous on the keel; lemma 1.5 mm. long, thin, truncate, the nerves minutely excurrent, awned, the awn inserted one-third from the base, 3 mm. long, curved, scarcely twisted below, the callus with short hairs on the sides; palea minute; anthers 0.5 mm. long.

Type in the U. S. National Herbarium, No. 1910715, collected in dense *Abies-Cupressus* forest, along road between San Marcos and Serchil, altitude 2,700–3,150 meters, Department of San Marcos, Guatemala, January 30, 1941, by Paul C. Standley (No. 85379).

Probably most closely related to *A. tolucensis* H. B. K., differing in having lax culms and foliage, and open panicles, the branches naked below. *Standley* 83813, collected in the region of Boxantín, Department of Quezaltenango, differs from the type in having panicles 12–15 cm. long.

AGROSTIS ABIETORUM Swallen, sp. nov.

Perennis; culmi erecti, caespitosi, 25–45 cm. alti; vaginae internodiis paulo breviores, glabrae; ligula 2–4 mm. longa, decurrens; laminae 4–7 cm. longae, 1–1.5 mm. latae, planae, firmae, scabrae; paniculae 7–12 cm. longae, diffusae, ramis solitariis vel binatis, sparse scabris, basi nudis, ramulis et pedicellis rigide divaricatis; spiculae 2.3–2.5 mm. longae; glumae acutae, aequales, vel prima secunda longior, in carina scabrae; lemma 2 mm. longum, in nervis scabrum, arista 3 mm. longa supra basin ¼ inserta, geniculata, infra geniculam contorta praeditum, calli marginibus sparse barbatum pilis brevibus; antherae 1 mm. longae.

Perennial; culms tufted, erect, 25–45 cm. high; sheaths a little shorter than the internodes, glabrous; ligule 2–4 mm. long, decurrent; blades 4–7 cm. long, 1–1.5 mm. wide, flat or becoming involute, rather firm, scabrous; panicles 7–12 cm. long, diffuse, the branches solitary or in pairs, sparsely scabrous, naked at the base, the branchlets and usually the pedicels stiffly divaricate with a pulvinus in the axils; spikelets 2.3–2.5 mm. long; glumes acute, equal or the first a little longer, scabrous on the keel; lemma 2 mm. long, scabrous on the nerves, these slightly excurrent, the awn 3 mm. long inserted about one-fourth above the base, geniculate, tightly twisted below the bend, the callus sparsely bearded on the sides, the hairs short; anthers 1 mm. long.

Type in the Chicago Natural History Museum, No. 1046517, collected on dry banks in *Cupressus-Abies* forest, along road between San Sebastián at Km. 21 and Km. 8, 8–18 miles northwest of San Marcos, Volcán Tajumulco, altitude 2,700–3,800 meters, Department of San Marcos, Guatemala, February 15, 1940, by Julian A. Steyermark (No. 35652).

Related to the preceding species but differs in the stiff habit, the stiffly divaricate panicle branchlets, the longer lemma and anthers, and the tightly twisted awn.

AGROSTIS EXSERTA Swallen, sp. nov.

Perennis; culmi dense caespitosi, 10–20 cm. alti, graciles, erecti vel adscendentes, glabri, enodosi; vaginae glabrae, brevissimae, suprema usque ad 5.5 cm. longa; ligula 1.5–2 mm. longa; laminae firmae, involutae, glabrae, curvatae, 1–4 cm. longae; paniculae 1–5 cm. longae, pauciflorae, purpureae, ramis brevibus glabris, rigide adscendentibus, supra medium ramosis, ramulis 1–2-spiculatis; spiculae 1.5–1.6 mm. longae; glumae aequales, plus minusve cucullatae, subacutae, in carina minute scabrae; lemma glumas subaequans, obtusissimum, minute erosum, exaristatum vel arista brevi, recta, gracili, supra basin ½ inserta praeditum; palea lemmate paulo brevior; rachilla lemmate ⅔ brevior.

Perennial; culms slender, densely tufted, 10–20 cm. high, erect or ascending, glabrous, without culm nodes; sheaths glabrous, those of the innovations very short, the single culm sheath as much as 5.5 cm. long; ligule 1.5–2 mm. long; blades firm, involute, glabrous, curved, 1–4 cm. long; panicles 1–5 cm. long, few-flowered, purple, the short, smooth branches stiffly ascending, branching above the middle, the branchlets bearing one or two spikelets; spikelets 1.5–1.6 mm. long; glumes equal, somewhat cucullate, subacute, minutely scabrous on the keel; lemma about as long as the glumes, very obtuse, minutely erose, awnless or with a short, straight, slender awn from the middle of the back; palea a little shorter than the lemma; rachilla joint one-third as long as the floret.

Type in the U. S. National Herbarium, No. 1914768, collected in alpine area, vicinity of Tojquia, Sierra de los Cuchumatanes, altitude 3,700 meters, Department of Huehuetenango, Guatemala, August 5, 1942, by Julian A. Steyermark (No. 50119).

This species is related to *A. bacillata* Hack., which differs in having culms with one or two nodes, longer, finer, and softer blades, more slender, flexuous, implicate panicle branches, and a much longer rachilla.

AGROSTIS ARCTA Swallen, sp. nov.

Perennis; culmi dense caespitosi, erecti, basi decumbentes, 5–10 cm. alti; vaginae glabrae, plus minusve carinatae; ligula 1–2 mm. longa, decurrens; laminae firmae, conduplicatae vel involutae, curvatae, 2–6 cm. longae, subtus laeves, supra scabrae, marginibus scabrae; paniculae 2–3.5 cm. longae, ramis appressis basi nudis; spiculae 2.1–2.3 mm. longae; glumae aequales, acutae, in carina scabrae; lemma 1.5–1.7 mm. longum, truncatum, minute scabrum, summo nervosum, exaristatum vel arista brevi supra basin ½ inserta praeditum; palea minuta; antherae 0.6 mm. longae.

Perennial; culms rather densely tufted, erect from a decumbent, rhizomelike base, 5–10 cm. high; sheaths glabrous, somewhat keeled; ligule 1–2 mm. long, decurrent; blades firm, folded or involute, curved, blunt, 2–6 cm. long, smooth below, scabrous above and on the margins; panicles 2–3.5 cm. long, the more or less scabrous branches appressed, naked at the base; spikelets 2.1–2.3 mm. long; glumes equal, acute, rather strongly scabrous on the keel; lemma 1.5–1.7 mm. long, truncate, minutely scabrous in lines, the nerves rather prominent at the summit, awnless or with a very slender short awn from the middle of the back; palea minute; anthers 0.6 mm. long.

Type in the U. S. National Herbarium, No. 1586052, collected on open moist roadside at Santa Elena, altitude 2,400–2,700 meters, Department of Chimaltenango, Guatemala, July 17, 1933, by A. F. Skutch (No. 422).

AGROSTIS VESCA Swallen, sp. nov.

Perennis; culmi gracillimi, erecti, basi decumbentes, 20–30 cm. alti; vaginae internodiis paulo brevior, glabrae; ligula truncata, erosa, 0.5–1 mm. longa; culmorum laminae 5–9 cm. longae, 1 mm. latae, planae, subtus laeves, supra scaberulae, eae innovationum involutae, filiformes; paniculae 4–8 cm. longae, purpureae, ramis gracilibus, subglabris, adscendentibus, supra medium ramosis, ramulis paucifloris; spiculae 1.6–1.8 mm. longae; glumae aequales, acutae; lemma 1.3–1.4 mm. longum, truncatum, minute erosum, exaristatum; palea minuta; antherae 0.8 mm. longae.

Perennial; culms very slender, erect from a decumbent base, 20–30 cm. high; sheaths about as long as the internodes, glabrous; ligule truncate, erose, 0.5–1 mm. long; culm blades mostly 5–9 cm. long, about 1 mm. wide, flat, smooth below, scaberulous above, those of the innovations involute, filiform, sometimes elongate; panicle 4–8 cm. long, purple, the slender nearly glabrous branches ascending, branching above the middle, the branchlets few-flowered; spikelets 1.6–1.8 mm.

long; glumes equal or nearly so, rather broadly acute; lemma 1.3–1.4 mm. long, truncate, minutely erose, awnless; palea minute; anthers 0.8 mm. long.

Type in the U. S. National Herbarium, No. 1586050, collected on open, moist roadside at Santa Elena, Department of Chimaltenango, Guatemala, altitude 2,400–2,700 meters, July 17, 1933, by A. F. Skutch (No. 420).

CALAMAGROSTIS PINETORUM Swallen, sp. nov.

Perennis; culmi erecti, 120 cm. alti, glabri; vaginae scaberulae, inferiores internodiis longiores, superiores internodiis breviores; ligula 4.5 mm. longa, obtusa, decurrens; laminae 26–33 cm. longae, 5–6 mm. latae, scabrae, suprema reducta; panicula 16 cm. longa, 3 cm. lata, densa, in parte inferiore interrupta, ramis anguste adscendentibus; spiculae 5.5–6 mm. longae; glumae acutae, subaequales, 3-nerves, scabrae; lemma 4 mm. longum, scabrum, nervis excurrentibus, arista 3 mm. longa praeditum, hac supra basin 1 mm. inserta, geniculata, infra geniculam contorta, calli marginibus breviter barbatum; palea lemmate paulo brevior; rachilla 1 mm. longa, pilosa pilis 0.5 mm. longis.

Perennial; culms erect from a rhizomelike base, 120 cm. high, glabrous; sheaths scaberulous, the lower ones longer, the upper ones much shorter than the internodes; ligule 4.5 mm. long, obtuse, decurrent; blades 26–33 cm. long, 5–6 mm. wide, scabrous, the uppermost much shorter and narrower; panicle 16 cm. long, about 3 cm. wide, dense, interrupted below, the branches narrowly ascending, long and short ones intermixed; spikelets 5.5–6 mm. long; glumes subequal, 3-nerved, scabrous; lemma 4 mm. long, scabrous, the nerves excurrent as short awns, the awn inserted 1 mm. above the base, 3 mm. long, geniculate, tightly twisted below the bend, the callus sparsely bearded on the sides with short hairs; palea a little shorter than the lemma; rachilla 1 mm. long, bearded with appressed hairs 0.5 mm. long, bearing a rudimentary second floret reduced to a bristle 2 mm. long.

Type in the U. S. National Herbarium, No. 1914760, collected on dry pine slopes between Finca Piamonte and slope southwest of Finca Piamonte, altitude 2,400–2,500 meters, Department of El Progreso, Guatemala, February 4, 1942, by Julian A. Steyermark (No. 43454).

Another specimen, *Standley* 42502, collected along Río Repollal, Department of Zacapa, is referable to this species but differs in wanting a reduced second floret.

MUHLENBERGIA VAGINATA Swallen, sp. nov.

Annua; culmi gracillimi, decumbentes, ramosissimi, ramis brevibus fasciculatis; vaginae breves, aggregatae, glabrae; ligula 1.2–2 mm. longa, tenuis, decurrens; laminae 6–14 mm. longae, 0.6–1 mm. latae,

planae, firmae, nervosae, acutae, naviculares, subtus glabrae, supra scabrae, marginibus scarbrae; paniculae usque ad 1.5 cm. longae, angustae, pauciflorae; spiculae 1.8 mm. longae; glumae subaequales, spicula ⅔–½ breviores, obtusae, plus minusve irregulares; lemma acutum, nervosum, basi sparse pubescens.

Annual; culms very slender, decumbent spreading with ascending ends, rather freely branching, the branches short with very short fasciculate branchlets; sheaths short, crowded, glabrous; ligule 1.2–2 mm. long, thin, decurrent; blades 6–14 mm. long, 0.6–1 mm. wide, flat, firm, strongly nerved, acute, the tip navicular, smooth beneath, scabrous above and on the margins; panicles not more than 1.5 cm. long, usually much less, narrow, few-flowered; spikelets 1.8 mm. long; glumes one-third to nearly one-half as long as the spikelet, subequal, irregularly obtuse, the first sometimes notched; lemma acute, strongly nerved, sparsely pubescent at the base.

Type in the Chicago Natural History Museum, No. 1046643, collected in spring-fed meadow along quebrada, 4 kilometers from San Sebastián, northwest of San Marcos, Department of San Marcos, Guatemala, February 15, 1940, by Julian A. Steyermark (No. 35598).

Related to *M. filiformis* (Thurb.) Rydb. which differs in the much more erect habit, simple culms, or branching only at the lower nodes, without fascicled branchlets, longer blades and the usually long exserted, much longer panicles.

MUHLENBERGIA CALCICOLA Swallen, sp. nov.

Perennis; culmi densissime caespitosi, erecti, basi decumbentes, 4–7 cm. alti, nodis inferioribus ramosi, ramis brevibus laminas breves fasciculatas gerentibus; vaginae breves, approximatae, glabrae; ligula hyalina, truncata, decurrens, usque ad 0.6 mm. longa; laminae crassae, firmae, 6–15 mm. longae, 1–1.5 mm. latae, planae vel incurvae, subtus laeves, supra et marginibus scabrae; paniculae 1–1.5 cm. longae, angustae, pauciflorae, ramis brevibus, rigidis, appressis vel anguste adscendentibus, minute hispidulis; spiculae 2 mm. longae; glumae aequales, obtusae, lemmate ca. ½ breviores; lemma acuminatum, mucronatum, glabrum.

Perennial; culms in very dense tufts, erect from a decumbent base, 4–7 cm. tall, bearing short branches with short fascicled blades from the lower nodes; sheaths short, crowded, glabrous; ligule hyaline, truncate, decurrent, as much as 0.6 mm long; blades thick, firm, 6–15 mm. long, 1–1.5 mm. wide, flat or the margins incurved toward the blunt tip, smooth below, more or less scabrous above and on the margins; panicles 1–1.5 cm. long, narrow, few-flowered, the short, stiff, relatively stout branches apressed or narrowly ascending, minutely hispidulous, bearing one or two spikelets; spikelets about 2 mm. long, the glumes obtuse,

a little more than half as long as the lemma, the lemma acuminate, mucronate, glabrous.

Type in the U. S. National Herbarium, No. 1910686, collected in open limestone *Juniperus* forest, along road in region of Chémal, altitude about 3,300 meters, Sierra de los Chuchumatanes, Department of Huehuetenango, Guatemala, December 31, 1940, by Paul C. Stanley (No. 81703).

MUHLENBERGIA BREVICULMIS Swallen, sp. nov.

Annua; culmi graciles, erecti vel basi decumbentes, 8–12 cm. alti, ramosi, glabri; vaginae internodiis breviores, glabrae; ligula 0.8–1 mm. longa; laminae 6–17 mm. longae, 1 mm. latae, planae, firmae, nervosae, scaberulae; paniculae longe exsertae, 1.5–2.5 cm. longae, ramis gracilibus rigide adscendentibus, paucifloris, inferioribus 8–10 mm. longis; spiculae 2.5–2.8 mm. longae, appressae; glumae obtusae spicula ½ brevior; lemma acutum vel mucronatum, glabrum.

Annual; culms slender, erect, or decumbent at the base, mostly 8–12 cm. high, branching, glabrous; sheaths mostly shorted than the internodes, rounded, glabrous; ligule 0.8–1 mm. long; blades 6–17 long, 1 mm. wide, flat, firm, strongly nerved, scaberulous; panicles usually long-exserted, mostly 1.5–2.5 cm. long, the relatively slender branches stiffly ascending, few-flowered, the lower ones 8–10 mm. long; spikelets 2.5–2.8 mm. long, appressed, lead-colored; glumes obtuse, about half as long as the spikelet; lemma acute or mucronate, glabrous.

Type in the U. S. National Herbarium, No. 1935054, collected on the top of Cerro Chemalito, Sierra de los Cuchumatanes, 3½ miles west of Santa Eulalia, Department of Huehuetenango, Guatemala, altitude 3,100–3,150 meters, August 2, 1942, by Julian A. Steyermark (No. 49905).

MUHLENBERGIA OROPHILA Swallen, sp. nov.

Perennis; culmi densissime caespitosi, erecti, 12–25 cm. alti; vaginae internodiis longiores, glabrae; ligula truncata, ca. 0.5 mm. longa; laminae 6–8 cm. longae, 1–1.5 mm. latae, subattenuatae, glabrae, marginibus scabrae; paniculae 5–8 cm. longae, ramis gracilibus, scabris, in parte inferiore nudis; spiculae purpureae, 3–3.5 mm. longae; glumae subaequales vel prima secunda paulo brevior, 1.5–2 mm. longae, acutae; lemma glabrum, subacuminatum, arista scabra, 0.5–1 mm. longa praeditum.

Perennial; culms very densely tufted, erect, 12–25 cm. tall; sheaths all longer than the internodes, glabrous; ligule truncate, about 0.5 mm. long; blades 6–8 cm. long, 1–1.5 mm. wide, subattenuate, glabrous, or finely scabrous toward the tip and on the margins; panicles 5–8 cm. long, partly enclosed in the sheath, the slender scabrous branches

naked below bearing a few spikelets at the ends of the branchlets; spikelets dark purple, 3–3.5 mm. long not including the awn; glumes subequal or the first a little shorter, 1.5–2 mm. long, acute; lemma glabrous, gradually tapering into the short scabrous awn, the awn 0.5–1 mm. long.

Type in Chicago Natural History Museum, No. 1202399, collected in alpine meadow, summit of Sierra de los Cuchumantanes, altitude 3,700–3,800 meters, Cerro Chémal, Department of Huehuetenango, Guatemala, August 8, 1942, by Julian A. Steyermark (No. 50309).

MUHLENBERGIA HINTONI Swallen, sp. nov.

Perennis; culmi graciles, dense caespitosi, erecti, 27–50 cm. alti; vaginae basi aggregatae, ecarinatae, glabrae; ligula ca. 1 mm. longa, obtusa vel truncata, decurrens; laminae involutae, 9–30 cm. longae, supra minute pubescentes, subtus glabrae, marginibus scabrae; panic-ulae 4–12 cm. longae, ramis distantibus gracilibus, scabris, rigide adscendentibus vel divergentibus, infimo usque ad 4.5 cm. longo, ramulis adscendentibus; spiculae 2.6–2.8 mm. longae, breve pedicel-latae, divergentes; glumae obtusae, bilobatae, exaristatae vel inter lobos breviaristatae, prima 1 mm. longa, secunda 1.2–1.5 mm. longa; lemma marginibus in parte inferiore et costa basi dense pubescens; arista 3.5–5 mm. longa, scabra; palea lemmate paulo brevior, acuta, inter carinas in parte inferiore dense pubescens; antherae 2 mm. longae.

Perennial; culms slender, densely tufted, erect, 27–50 cm. high; sheaths mostly crowded toward the base, rounded, glabrous; ligule about 1 mm. long, obtuse or truncate, decurrent; blades involute, 9–30 cm. long, glabrous below, minutely pubescent above at least toward the base, the margins scabrous; panicles 4–12 cm. long, the branches distant, slender, scabrous, finally stiffly ascending or spreading, the lowermost as much as 4.5 cm. long, the branchlets stiffly ascending spikelets 2.6–2.8 mm. long, short-pedicellate, stiffly spreading; glumes obtuse, usually 2-lobed, awnless or usually short-awned from between the lobes, the first 1 mm. long, the second 1.2–1.5 mm. long; lemma densely pubescent on the margins in the lower half and on the mid-nerve at the base, bearing a slender scabrous awn 3.5–5 mm. long; palea a little shorter than the lemma, acute, densely pubescent between the keels in the lower half; anthers 2 mm. long.

Type in the U. S. National Herbarium, No. 1840838, collected in meadow, Crucero, Temascaltepec, State of Mexico, Mexico, altitude 2,880 meters, December 30, 1932, by George B. Hinton (No. 3059).

MUHLENBERGIA ERIOPHYLLA Swallen, sp. nov.

Perennis; culmi caespitosi, erecti, 17–22 cm. alti; vaginae internodiis longiores, ecarinatae, inferiores scabrae, fibrosae; ligula 5–9 mm.

longa, tenuis, decurrens; laminae planae, firmae, demum crispatae, supra dense lanatae pilis appressis, subtus et marginibus scabrae, 10–20 cm. longae, 1.2–1.5 mm. latae, suprema reducta; paniculae 4–8 cm. longae, ca. 5 mm. latae, densae, ramis appressis; spiculae 3.5–4 mm. longae, pedicellis scabris; glumae acutae, prima 3–3.5 mm. longa, secunda 3.5–4 mm. longa; lemma 3.5 mm. longum, in carina et marginibus in parte inferiore dense pilosum; palea lemmate paulo brevior, tenuis, inter carinas pilosa; antherae 1.5 mm. longae.

Perennial; culms tufted, erect, 17–22 cm. high; sheaths longer than the internodes, rounded, at least the lower ones scabrous, the lowermost becoming fibrous with age; ligule thin, decurrent, 5–9 mm. long; blades flat, firm, becoming curled with age, densely lanate on the upper surface with appressed hairs, scabrous on the lower surface and on the margins, the lower ones 10–20 cm. long, 1.2–1.5 mm. wide, the uppermost reduced; panicles 4–8 cm. long, about 5 mm. wide, rather dense, the branches appressed; spikelets 3.5–4 mm. long, the pedicels scabrous; glumes acute, the first 3–3.5 mm. long, the second 3.5–4 mm. long; lemma 3.5 mm. long, gradually narrowed into the awn, the awn 2 cm. long, densely pilose on the midnerve and margins in the lower half; palea a little shorter than the lemma, thin, pilose between the obscure keels; anthers 1.5 mm. long.

Type in the U. S. National Herbarium, No. 1840917, collected in oak woods at Luvianos, Temascaltepec, State of Mexico, Mexico, altitude 1,100 meters, May 12, 1933, by George B. Hinton (No. 5307).

MUHLENBERGIA CURVULA Swallen, sp. nov.

Perennis; culmi graciles, erecti, 60 cm. alti; vaginae internodiis multo longiores, inferiores aggregatae, carinatae, glabrae, superiores elongatae, scabrae; ligula usque ad 11 mm. longa, tenuis, attenuata; laminae 10–20 cm. longae, firmae, involutae, nervosae, scabrae, curvatae vel flexuosae; panicula 15 cm. longa, ramis distantibus, adscendentibus, infimo 5 cm. longo; spiculae 3.8–4.2 mm. longae; glumae bidentatae, glabrae, prima 2.8–3 mm. longa, 1-nervis, secunda 3.8–4.2 mm. longa, 3-nervis; lemma 3.5 mm. longum, dense villosum, arista gracilis, attenuata, flexuosa, scabra, 14–17 mm. longa praeditum; palea lemmate brevior, obtusa, marginibus hyalinis, in parte inferiore dense villosa.

Perennial; culms slender, erect, 60 cm. high; sheaths all much longer than the internodes, the lower ones crowded, rather short, compressed, keeled, glabrous, the upper ones elongate, rounded, scabrous; ligule as much as 11 mm. long, thin, attenuate; blades mostly 10–20 cm. long, firm, involute, strongly nerved, scabrous, curved or flexuous; panicle 15 cm. long, open, the branches somewhat distant, ascending, the lowermost 5 cm. long; spikelets 3.8–4.2 mm. long; glumes glabrous, unequal, notched, the first 2.8–3 mm. long, 1-nerved, the second 3.8–4.2

mm. long, 3-nerved; lemma 3.5 mm. long, densely villous, narrowed into a slender, attenuate, flexuous, scabrous awn 14–17 mm. long; palea shorter than the lemma, obtuse, with hyaline margins, densely villous on the lower half.

Type in the U. S. National Herbarium, No. 1963089, collected in dry oak-wooded slopes about 12 miles from Guanajuato on road to Santa Rosa, Guanajuato, Mexico, September 30, 1946, by H. E. Moore, Jr. (No. 1353).

MUHLENBERGIA AUREA Swallen, sp. nov.

Perennis; culmi erecti, 75 cm. alti; vaginae compressae, carinatae, 5 mm. latae, auriculatae, inferiores subequitantes ca. 20 cm. longae; ligula hyalina, 2 mm. longa; laminae ca. 75 cm. longae, 4–5 mm. latae, basi conduplicatae, scaberrimae, marginibus scabro-serratae; panicula 35 cm. longa, aurea, densa, ramis gracilibus, flexuosis, scabris, in parte inferiore nudis, inferioribus ca. 12 cm. longis; spiculae 2–2.2 mm. longae; glumae acuminatae, subaequales, carina scabrae, lemmate paulo breviores; lemma acuminatum, scabrum, in parte inferiore sparse pilosum, in callo dense barbatum, pilis 0.5 mm. longis; arista gracilis flexuosa, scabra, 13–17 mm. longa.

Perennial; culms erect about 75 cm. tall; sheaths conspicuously flattened and keeled, about 5 mm. wide as folded, scabrous, auriculate, with a rather definite ridge at the junction of the sheath and blade, the lower ones about 20 cm. long, subequitant; ligule hyaline, inconspicuous, about 2 mm. long; blades about 75 cm. long, 4–5 mm. wide, conduplicate at the base, flat above, very scabrous, the margins strongly scabrous-serrate; panicle 35 cm. long, golden, dense, the slender, scabrous, somewhat flexuous branches naked in the lower half, the lower ones about 12 cm. long; spikelets 2–2.2 mm. long; glumes acuminate, subequal, scabrous on the keel, a little shorter than the floret; lemma acuminate, scabrous, sparsely pilose below, the callus rather densely bearded on the sides, the hairs about 0.5 mm. long, the awn slender, flexuous, scabrous, 13-17 mm. long.

Type in the Chicago Natural History Museum, No. 1057948, collected in thickets at base of vertical slopes along railroad, Finca Pirineos, lower south-facing slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, altitude 1,300–1,500 meters, Department of Quexaltenango, Guatemala, December 31, 1939, by Julian A. Steyermark (No. 33175).

Muhlenbergia aurea is probably most closely related to *M. scoparia* Vasey, which differs in having much narrower sheaths and blades, an elongate ligule, a narrow, less densely flowered, purple panicle, and longer awns.

MUHLENBERGIA VERSICOLOR Swallen, sp. nov.

Perennis; culmi erecti, 1 m. alti, infra paniculam scabri; vaginae compressae, carinatae, internodiis multo longiores, inferiores dense minute pubescentes; ligula tenuis, decurrens, 5–10 mm. longa; laminae 25–40 cm. longae, 2–2.5 mm. latae, firmae, scabrae, suprema reducta; paniculae 18–20 cm. longae, 2–3 cm. latae, densae, ramis numerosis anguste adscendentibus, purpureis, scabris; spiculae 3–3.5 mm. longae, pallidae; glumae subaequales, acutae vel sub-acuminatae, lemma aequantes, dense pubescentes; lemma 3 mm. longum, in parte inferiore et summo marginibus dense villosum; arista gracilis, flexuosa, 15–25 mm. longa; palea lemma aequans, acuta, in parte inferiore villosa.

Perennial; culms erect, 1 m. tall, scabrous below the panicle; sheaths compressed, keeled, much longer than the internodes, the lower ones minutely, but densely pubescent; ligule thin, decurrent, 5–10 mm. long; blades 25–40 cm. long, 2–2.5 mm. wide, firm, scabrous, the uppermost reduced; panicles 18–20 cm. long, 2–3 cm. wide, dense, the numerous slender branches narrowly ascending, purple, scabrous; spikelets 3–3.5 mm. long, pale; glumes subequal, acute or subacuminate, about as long as the floret, densely pubescent; lemma 3 mm. long, densely villous on the back in the lower half, and on the margins nearly to the summit; narrowed into a slender flexuous awn 15–25 mm. long; palea as long as the lemma, acute, appressed villous below.

Type in the U. S. National Herbarium, No. 1961991, collected about 170 kilometers north of Oaxaca, Oaxaca, Mexico, December 13, 1945, by E. Hernández X. and J. A. Jenkins (No. X–810).

This species is probably most closely related to *Muhlenbergia speciosa* Vasey which has much larger panicles of smaller spikelets.

MESOSETUM STOLONIFERUM Swallen, sp. nov.

Perenne: culmi erecti, 26–47 cm. alti, glabri, nodis barbatis; vaginae internodiis longiores vel breviores, glabrae, summo plus minusve ciliatae; ligula dense ciliata, 0.5 mm. longa; laminae 8–15 cm. longae, 3–4 mm. latae, planae, firmae, glabrae, marginibus crassis, albidis, scabris, sparse hispido-ciliatis; stolones usque ad 1 m. longi, purpurei, internodiis 2.5–4 cm. longis, nodis barbatis, vaginis brevibus papilloso-pilosis, dense ciliatis, laminis reductis; racemi 3.5–7.5 cm. longi; rachis anguste alata, marginibus scabra; spiculae 5 mm. longae, breviter pedicellatae; glumae et lemma sterile subaequalia; gluma prima 3-nervis, basi angusta, scabra, abrupte cuspidata; gluma secunda 5-nervis, nervis lateralibus approximatis, marginibus in parte inferiore dense ciliata; lemma sterile obtusum, marginibus villosum; lemma fertile subacuminatum, bifariam longe pilosum.

Stoloniferous perennial; culms erect, 26–47 cm. high, glabrous, more or less bearded at the nodes; sheaths longer or somewhat shorter than

the internodes, glabrous, more or less ciliate toward the summit; ligule densely ciliate, 0.5 mm. long; blades 8–15 cm. long, 3–4 mm. wide, flat, firm, glabrous, the margins thickened, whitish, scabrous, sparsely hispid-ciliate; stolons as much as 1 m. long, purple, the internodes mostly 2.5–4 cm. long, the nodes bearded, the sheaths about half as long as the internodes, papillose-pilose, the margins densely ciliate, the blades reduced; raceme 3.5–7.5 cm. long, the rachis narrowly winged, the margins scabrous; spikelets 5 mm. long, short-pedicellate, the glumes and sterile lemma subequal; first glume 3-nerved, narrowed at the base, scabrous, abruptly pointed; second glume 5-nerved, the lateral nerves approximate, the margins densely ciliate in the lower half; sterile lemma obtuse, appressed villous on the margins nearly to the summit; fertile lemma subacuminate, with a line of long hairs on each side.

Type in the Chicago Natural History Museum No. 1061061, collected on dry rocky slopes of open glade, Montaña Castilla, vicinity of Montaña Cebollas, along Río Lucía Saso, 3 miles southeast of Quezaltepeque, Department Chiqiumula, Guatemala, altitude 1,200–1,500 meters, November 6, 1939, by Julian A. Steyermark (No. 31266).

AXONOPUS RAMOSUS Swallen, sp. nov.

Perennis; culmi graciles, erecti, ramosi, 45 cm. alti, glabri, nodis sparse pilosis; vaginae internodiis longiores, carinatae, glabrae, marginibus ciliatae; laminae 2.5–8 cm. longae, 1.5 mm. latae, glabrae, marginibus basi sparse hispidae; inflorescentiae terminales et axillares; racemi 1–3, digitati, graciles, 3–4 cm. longi; spiculae 1.3–1.4 mm. longae, oblongae, subacutae, glabrae; gluma secunda et lemma sterile tenuia, aequalia, nervo medio obsoleto, nervis lateralibus approximatis; fructus 1.3 mm. longus, minute papillosus.

Perennial; culms slender, tufted, erect, wiry, usually branching from the middle nodes, 45 cm. high, glabrous, the nodes sparsely pilose; sheaths mostly longer than the internodes, keeled but not compressed, glabrous on the back, the margins rather densely papillose-ciliate; ligule a very short ciliate rim; blades mostly 2.5–5 cm., sometimes as much as 8 cm. long, about 1.5 mm. wide, glabrous, with a few long stiff hairs on the margins at the base; inflorescences terminal and axillary from the uppermost sheath bearing 1–3 slender digitate recemes 3–4 cm. long; spikelets 1.3–1.4 mm. long, oblong, subacute, light brown, glabrous; second glume and sterile lemma thin, equal, covering the fruit, the midnerve supressed, the lateral nerves marginal; fruit 1.3 mm. long, minutely roughened, light brown.

Type in the New York Botanical Garden, No. 2940, collected in joints in bed rock, Savanna I, Table Mountain, Surinam, altitude 565 meters September 19, 1944, by Bassett Maguire (No. 24816).

In habit this species is very similar to *Axonopus caulescens* Mez,

which differs in having larger pubescent spikelets 2.3–2.4 mm. long, and coarser foliage.

AXONOPUS ELONGATUS Swallen, sp. nov.

Perennis; culmi erecti, ca. 1 m. alti, glabri; vaginae internodiis longiores, compressae, carinatae, summo marginibus pilosae vel subglabrae, suprema elongata; ligula membranacea, ciliata, 0.5–1 mm. longa; laminae 23–24 cm. longae, 3.5–4.5 mm. latae, planae, firmae, marginibus scabrae basi papilloso-ciliatae; inflorescentiae terminales et axillares, longe exsertae; racemi 2–6, 8–13 cm. longi, adscendentes; rachis 0.6 mm. lata, marginibus scabra; spiculae 3.6–4.2 mm. longae, 1.2 mm. latae, pedicellis 0.5 mm. longis; gluma secunda et lemma sterile aequalia, acuta, fructum superantia, inter nervos sparse pilosa vel subglabra, nervo mediali prominente; fructus 3.2 mm. longus, subobtusus, pallidus, glaber.

Perennial, probably with rhizomes; culms erect, about 1 m. tall, glabrous; sheaths longer than the internodes, compressed, keeled, appressed pilose on the margins toward the summit or nearly glabrous, the uppermost elongate, about 40 cm. long; ligule a ciliate membrane 0.5–1 mm. long; blades 23–24 cm. long, 3.5–4.5 mm. wide, flat, firm, scabrous at least on the margins, more or less papillose-ciliate at the base; inflorescences terminal and axillary, long-exserted; racemes 2–6, 8–13 cm. long, stiffly ascending, the rachis 0.6 mm. wide, scabrous on the margins; spikelets 3.6–4.2 mm. long, 1.2 mm. wide, the pedicels 0.5 mm. long; second glume and sterile lemma equal, acute, exceeding the fruit, sparsely pilose between the nerves or nearly glabrous, the midnerve of the glume rather prominent; fruit 3.2 mm. long, subobtuse, pale, glabrous.

Type in the Chicago Natural History Museum, No. 1041051, collected in pine forest, Sierra de las Minas, near summit of ridge below Finca Alejandria, Department of Zacapa, Guatemala, altitude 1,700–2,000 meters, October 12, 1939, by Julian A. Steyermark (No. 29781).

This species is probably most closely related to *Axonopus rosei* (Scribn. & Merr.) Chase, which differs in being densely caespitose with narrower blades, fewer and shorter racemes, and only terminal inflorescences. The spikelets are very similar, but the fruit of *A. elongatus* does not have a tuft of hairs at the tip.

PASPALUM HISPIDUM Swallen, sp. nov.

Perenne; culmi erecti vel geniculati, 45–55 cm. longi, ramosi, glabri, nodis barbatis; vaginae internodiis longiores, carinatae, sparse vel dense papilloso-hispidae; ligula membranacea, 2 mm. longa; laminae 10–15 cm. longae, 1–1.8 cm. latae, acuminatae, sparse vel dense papilloso-hispidae; racemi 9, 6–9 cm. longi, adscendentes vel divergentes,

basi pilosi et hispidi; rachis anguste altata, 1 mm. lata, scabra; spiculae 2.3–2.4 mm. longae, 1.1 mm. latae, acutae; gluma secunda 3-nervis, pilosa, marginibus dense ciliata; lemma sterile glabrum vel sparse pilosum; fructus ovato-ellipticus, 2 mm. longus, 1 mm. latus, subacutus, pallidus, minute striatus.

Perennial; culms erect or geniculate-ascending, 45–55 cm. or more long, branching, glabrous, the nodes bearded with ascending hairs; sheaths longer than the internodes, keeled but not compressed, sparsely to densely papillose-hispid, especially toward the summit, the hairs ascending or spreading; ligule membranaceous, brown, 2 mm. long; blades mostly 10–15 cm. long, 1–1.8 cm. wide, acuminate, somewhat narrowed to the rounded base, sparsely to densely papillose-hispid; inflorescence composed of 9 ascending or spreading racemes, the axis 8 cm. long; racemes 6–9 cm. long, pilose and hispid at the base, the rachis narrowly winged, 1 mm. wide, scabrous; spikelets 2.3–2.4 mm. long, 1.1 mm. wide, acute; second glume 3-nerved, pilose on the back, the margins rather densely ciliate-fringed; sterile lemma glabrous or sparsely pilose; fruit ovate-elliptic, 2 mm. long, 1 mm. wide, subacute, pale, minutely striate.

Type in the U. S. National Herbarium, No. 1935050, collected on flat, sandy, gravelly plain along Río Amelco, Sierra de los Cuchumatanes, below Finca San Rafael, Department of Huehuetenango, Guatemala, altitude 400 meters, July 27, 1942, by Julian A. Steyermark (No. 49670).

Another specimen, *Steyermark* 49709, has blades as much as 24 cm. long, 2.5 cm. wide, and racemes 10 cm. long.

Paspalum hispidum is related to *P. nelsoni* Chase, which has larger panicles, more racemes which are ciliate with long stiff hairs, and somewhat shorter and broader spikelets.

PANICUM VENOSUM Swallen, sp. nov.

Annum; culmi erecti vel geniculati, 35–40 cm. alti, glabri, nodis barbatis; vaginae internodiis longiores; glabrae, marginibus ciliatae; ligula membranacea, ciliata, 1 mm. longa; laminae 4–9 cm. longae, 5–8 mm. latae, glabrae, marginibus basi sparse ciliatae; paniculae 12–14 cm. longae, 4 cm. latae, ramis adscendentibus, in parte inferiore nudis, infimo 10 cm. longo, ramulis appressis; spiculae 2.5–2.6 mm. longae, ovatae, glabrae, appressae; gluma prima 1.3–1.7 mm. longa, acuta, 5-nervis; gluma secunda et lemma sterile aequalia, hiulca, 7–9 nervia, fructu longiora; fructus 2 mm. longus, 1 mm. latus, acutus, rugosus.

Annual; culms erect or somewhat geniculate, 35–40 cm. high, glabrous, the nodes appressed pilose; sheaths mostly longer than the internodes, glabrous, the margins ciliate; ligule a ciliate membrane

1 mm. long, including the hairs; blades 4–9 cm. long, 5–8 mm. wide, glabrous, the margins sparsely ciliate at the rounded base; panicles 12–14 cm. long, 4 cm. wide, the branches stiffly ascending, naked below, rather densely flowered above, the lowermost 10 cm. long, the branchlets appressed; spikelets 2.5–2.6 mm. long, ovate, glabrous, appressed; first glume 1.3–1.7 mm. long, acute, 5-nerved, clasping; second glume and sterile lemma equal, longer than the fruit, gaping, strongly 7–9 nerved; fruit 2 mm. long, 1 mm. wide, acute, straw-colored, rugose.

Type in the U. S. National Herbarium, No. 1764850, collected near irrigation ditch 1 mile southwest of Apatzingán, Michoacán, Mexico, August 5, 1940, by William C. Leavenworth (No. 481).

PANICUM FURVUM Swallen, sp. nov.

Perenne; culmi dense caespitosi, erecti, 10–21 cm. alti, glabri vel sparse pilosi, nodis barbatis; folia basi aggregata; vaginae glabrae vel basi sparse pilosae; ligula ciliata, ca. 0.5 mm. longa; laminae 2–6.5 cm. longae, 2–4 mm. latae, glabrae, marginibus basi sparse papilloso-ciliatae; paniculae 3.5–6 cm. longae, longe exsertae, ramis anguste adscendentibus infimis ca. 3 cm. longis; spiculae 1.5–1.6 mm. longae, glabrae; gluma prima 1.3–1.5 mm. longa, acuta, triangularis, 5-nervis; gluma secunda et lemma sterile subaequalia, hiulca, 5-nervia; fructus 1.6 mm. longus, ellipticus, acutus, furvus, laevis, lucidus.

Perennial; culms densely tufted, erect, 10–21 cm. high, glabrous, or sparsely pilose near the bearded nodes; leaves mostly crowded at the base, one on the mid-culm; sheaths rounded, glabrous, or with a few long hairs toward the base; ligule ciliate, about 0.5 mm. long; blades 2–6.5 cm. long, 2–4 mm. wide, glabrous, sparsely papillose-ciliate toward the base; panicles 3.5–6 cm. long, long-exserted, the branches narrowly ascending, the lowermost about 3 cm. long; spikelets 1.5–1.6 mm. long, glabrous, pale tinged with purple; first glume 1.3–1.5 mm. long, acute, broadly triangular, clasping, strongly 5-nerved; second glume and sterile lemma subequal or the sterile lemma a little longer, gaping, strongly 5-nerved; fruit 1.6 mm. long, elliptic, acute, dark brown, smooth and shining.

Type in the U. S. National Herbarium, No. 1935086, collected between Nentón and Las Palmas, via Yalisjao, Rincón Chiquite, Chiaquial, Guaxacaná, in Sierra de los Cuchumatanes, Department of Huehuetenango, Guatemala, altitude 800–1,200 meters, August 30, 1942, by Julian A. Steyermark (No. 51627).

This species is allied with *Panicum filipes* Scribn., which differs in having elongate blades which usually equal or exceed the panicle, larger panicles with more crowded or grouped spikelets, and pale rather than dark brown fruits.

PANICUM PAUCIFOLIUM Swallen, sp. nov.

Perenne; culmi graciles, erecti, bulbosi, 120 cm. alti, glabri, 2–3-foliati; vaginae internodiis longiores, dense papilloso-pilosae; ligula membranacea, eroso-ciliata, 0.5 mm. longa; laminae 18–20 cm. longae, 3–5 mm. latae, firmae, acuminatae, glabrae, vel supra papilloso-pilosae; paniculae 9–23 cm. longae, angustae, pauciflorae, ramis adscendentibus inferioribus distantibus usque ad 8 cm. longis; spiculae 4.5–5 mm. longae, glabrae, purpureae; gluma prima 1.5–2 mm. longa, obtusa, 3-nervis; gluma secunda 3–3.5 mm. longa, fructu multo brevior; lemma sterile fructu paulo brevius, obtusum, 5-nerve; fructus 4.2 mm. longus, acutus, minute rugosus.

Perennial; culms slender, erect from a bulbose base, 120 cm. tall, glabrous, with two or three leaves on the lower part, the upper two-thirds naked; sheaths overlapping, densely papillose-pilose; ligule an eroseciliate membrane 0.5 mm. long; blades 18–20 cm. long, 3–5 mm. wide, firm, acuminate, glabrous, or papillose-pilose on the supper surface; panicle 9–23 cm. long, narrow, few-flowered, the branches stiffly ascending, the lowermost distant, as much as 8 cm. long, the uppermost much reduced, somewhat crowded; spikelets 4.5–5 mm. long, glabrous, purple; first glume 1.5–2 mm. long, obtuse, 3-nerved; second glume 3–3.5 mm. long, much shorter than the fruit; sterile lemma a little shorter than the fruit, obtuse, 5-nerved, with a well developed palea slightly exceeding it; fruit 4.2 mm. long, acute, minutely rugose.

Type in the U. S. National Herbarium, No. 1935372, collected on rocks in pine forest, Santa Inés, Department of Morazán, Honduras, altitude 900 meters, July 19, 1947, by Antonio Molina R. (No. 348).

Related to *Panicum bulbosum* H. B. K., differing in having nearly naked culms, narrow inflorescence of larger spikelets, and densely papillose-pilose sheaths.

PANICUM INCUMBENS Swallen, sp. nov.

Perenne; culmi 85 cm. longi, decumbentes, ramosi, sparse pilosi, pilis appressis; vaginae internodiis longiores, papillosae vel papillosohispidae, pilis divergentibus; ligula membranacea, ciliata, ca. 0.5 mm. longa; laminae 13–22 cm. longae, 9–18 mm. latae, acuminatae, supra scabrae, subtus subglabrae, marginibus crassis, albis, scabris; panicula 6 cm. longa, pauciflora, ramis abscendentibus, scabris et pilosis; spiculae 2.9–3 mm. longae, ellipticae, acutae, glabrae; gluma prima spicula ⅙–⅓ brevior, subacuta, enervis; gluma secunda et lemma sterile aequalia, 5–7-nervia, fructu paulo longiora; fructus 2.6 mm. longus, striatus, minute transverse nervosus, villosus.

Perennial; culms 85 cm. long, decumbent spreading, sparingly

branching, rather sparsely appressed pilose; sheaths all longer than the internodes, papillose or papillose-hispid with spreading hairs; ligule membranaceous, ciliate, about 0.5 mm. long; blades 13–22 cm. long, 9–18 mm. wide, acuminate, scabrous above, nearly smooth beneath, with thickened, white, sharply serrate-scabrous margins; panicle 6 cm. long, few-flowered, the branches stiffly ascending, the axis and branches scabrous and pilose; spikelets 2.9–3 mm. long, elliptic, acute, glabrous; first glume one-sixth to one-third as long as the spikelet, subacute, nerveless; second glume and sterile lemma equal, 5–7 nerved, slightly longer than the fruit; fruit 2.6 mm. long, striate, very minutely transversely veined, rather densely silky-villous.

Type in the Chicago Natural History Museum, No. 1039524, collected in cloud forest on top of Cerro Tixixí, 3–5 miles north of Jocotán, altitude 500–1,500 meters, Department of Chiquimula, Guatemala, November 10, 1939, by Julian A. Steyermark (No. 31573).

Panicum incumbens belongs in the Parviglumia group, having larger spikelets than any other species known so far in the group. It is most closely allied to *P. parviglume* Hack., which differs in having usually shorter and broader blades, mostly 2–3 cm. wide, and spikelets 2.5 mm. long. The panicle axis and branches are scabrous only, and the sheaths are glabrous or only sparsely papillose-hispid.

PANICUM CAYOENSE Swallen, sp. nov.

Perenne; culmi erecti, 105 cm. alti, ramosi, dense villosi; vaginae dense hispidulae vel papilloso-hispidae, suprema glabra, inferiores internodiis longiores, superiores breviores; ligula membranacea, ciliata, 0.5 mm. longa; laminae 10–16 cm. longae, 15–21 mm. latae, acuminatae, pubescentes, subvelutinae; paniculae ca. 21 cm. longae, ramis rigide adscendentibus, scabris, basi ramulis brevibus appressis; spiculae 2.3–2.5 mm. longae, glabrae; gluma prima spicula ¾ brevior, acuta, enervis; gluma secunda et lemma sterile subaequalia, fructu longiora; fructus 2 mm. longus, 1 mm. latus, subacutus; lemma marginibus dense villosum; palea dense villosa.

Perennial; culms apparently erect, 105 cm. high, sparingly branching, densely villous; sheaths densely hispidulous to papillose-hispid, the uppermost smooth, the lower ones longer, the upper ones shorter than the internodes; ligule a ciliate membrane 0.5 mm. long; blades 10–16 cm. long, 15–21 mm. wide, acuminate, softly pubescent, almost velvety, on both surfaces; panicles about 21 cm. long, partly enclosed in the sheath, the branches stiffly ascending, scabrous, bearing short appressed branchlets from near the base; spikelets 2.3–2.5 mm. long, evenly spaced on the branches, not clustered, glabrous; first glume one-fourth as long as the spikelet, broadly acute, nerveless; second glume and sterile lemma subequal, pointed beyond the fruit; fruit 2 mm. long,

1 mm. wide, acutish, densely villous with silky hairs on the palea and margins of the lemma, the back of the lemma glabrous or nearly so.

Type in the U. S. National Herbarium, No. 1722487, collected on top of limestone hill at San Agustín, Mountain Pine Ridge, El Cayo District, British Honduras, July–August 1936, by C. L. Lundell (No. 6809).

PANICUM BREVIRAMOSUM Swallen, sp. nov.

Perenne (?); culmi graciles, ramosi, decumbentes, ca. 75 cm. longi, glabri; vaginae internodiis breviores, glabrae, collo dense pubescentes; ligula membranacea, erosa, 0.2 mm. longa; laminae 4–10 cm. longae, 4–9 mm. latae, acuminatae, sparse papilloso-hispidae, marginibus scabris; paniculae 4.5–5.5 cm. longae, ramis brevibus dense spiculatis; spiculae 2 mm. longae, glabrae; gluma prima 0.5–1 mm. longa; gluma secunda et lemma sterile aequalia, obtusa; fructus 1.9 mm. longus, 1.2 mm. latus, ellipticus, sparse pilosus.

Perennial (?); culms slender, straggling, branching, about 75 cm. long, glabrous; sheaths mostly shorter than the internodes, glabrous, the collar densely pubescent; ligule an erose membrane 0.2 mm. long; blades 4–10 cm. long, 4–9 mm. wide, acuminate, sparsely papillose-hispid with a tuft of long hairs just above the ligule, the margins scabrous; panicles 4.5–5.5 cm. long, with a few ascending, densely flowered branches, the lowermost 1–1.5 cm. long, scabrous; spikelets 2 mm. long, glabrous; first glume 0.5–1 mm. long; second glume and sterile lemma equal, obtuse, covering the fruit; fruit 1.9 mm. long, 1.2 mm. wide, elliptic, straw-colored, sparsely pilose.

Type in the U. S. National Herbarium, No. 1935038, collected on pine-clad slope along stream, vicinity of Nucapuxlac, Department of Huehuetenango, Guatemala, altitude 2,500 meters, July 17, 1942, by Julian A. Steyermark (No. 48948).

PANICUM HINTONI Swallen, sp. nov.

Perenne (?); culmi decumbentes, nodis inferioribus radicantes, papillosi vel papilloso-pilosi; vaginae, suprema excludens, internodiis multo breviores, glabrae, in collo dense pubescentes; ligula membranacea, 0.2 mm. longa; laminae 10–14 cm. longae, 9–17 mm. latae, suprema reducta, acuminatae, scabrae; paniculae 9–16 cm. longae, 5–9 cm. latae, ramis gracilibus adscendentibus vel divergentibus, ramulis divergentibus implicatis; spiculae 2.2–2.4 mm. longae, 0.9–1 mm. latae, glabrae; gluma prima 0.8–1.3 mm. longa, acuta vel subobtusa, enervis; gluma secunda et lemma sterile aequalia, obtusa, 9-nervia; fructus 2.1 mm. longus, ellipticus, apiculatus, laevis, lucidus.

Perennial (?); culms decumbent spreading, rooting at the lower nodes, papillose or papillose-pilose; sheaths, except the upper ones, much shorter than the internodes, glabrous, the collar densely pubes-

cent; ligule a membrane 0.2 mm. long; blades 10–14 cm. long, 9–17 mm. wide, the uppermost usually reduced, acuminate, scabrous; panicles 9–16 cm. long, 5–9 cm. wide, the slender branches ascending or spreading, the branchlets divergent, implicate; spikelets 2.2–2.4 mm. long, 0.9–1 mm. wide, glabrous; first glume 0.8–1.3 mm. long, acute or subobtuse, nerveless; second glume and sterile lemma equal, covering the fruit, obtuse, 9-nerved; fruit 2.1 mm. long, elliptic, apiculate, smooth and shining.

Type in the U. S. National Herbarium, No. 1867697, collected at Bejucos, Temascaltepec, State of Mexico, Mexico, altitude 610 meters, November 8, 1932, by George B. Hinton (No. 2527).

Closely allied to *Panicum albomaculatum* Scribn., which has larger, pubescent spikelets 2.8 mm. long and firmer, usually hairy blades.

PANICUM UMBONULATUM Swallen, sp. nov.

Perenne; culmi decumbentes, ca. 1 m. longi, ramosi, nodis inferioribus radicantes, papillosi, papilloso-pilosi, vel subglabri; vaginae internodiis longiores, papillosae vel papilloso-pilosae, collo dense pubescentes; ligula membranacea, ciliata, ca. 0.5 mm. longa; laminae 5–10 cm. longae, 3–8 mm. latae, subglabrae, supra basin sparse pilosae, marginibus basi papilloso-ciliatae; paniculae ca. 11 cm. longae, 5–6 cm. latae, purpureae, ramis rigide adscendentibus, glabris, viscidis; spiculae 2.4–2.5 mm. longae, glabrae; gluma prima acuta vel subobtusa, spicula ca. ½ brevior; gluma secunda et lemma sterile aequalia, fructu paulo longiora; fructus umbonulatus, 2.1 mm. longus, ellipticus, acutus, lucidus.

Perennial; culms decumbent spreading, probably about 1 m. long, branching and rebranching, rooting at the lower nodes, papillose or papillose-pilose to nearly glabrous; sheaths usually longer than the internodes, papillose or papillose-pilose, rather densely pubescent across the back on the collar; ligule a very short ciliate membrane about 0.5 mm. long; blades 5–10 cm. long, 3–8 mm. wide, nearly glabrous, with a few long hairs on the upper surface at the base, the margins papillose-ciliate toward the base; panicles about 11 cm. long, 5–6 cm. wide, purple, the branches rather stiffly ascending, more or less viscid-spotted, glabrous; spikelets 2.4–2.5 mm. long, glabrous; first glume acute or subobtuse, about half as long as the spikelet; second glume and sterile lemma equal, slightly pointed beyond the fruit; fruit 2.1 mm. long, elliptic, acute, shining.

Type in the U. S. National Herbarium, No. 1935002, collected on upper slopes of Sierra de Las Minas, along Río Repollal, altitude 2,100–2,400 meters, Department of Zacapa, Guatemala, January 12–13, 1942, by Julian A. Steyermark (No. 42469).

Resembling and probably closely allied to *Panicum viscidellum* Scribn., which differs in having smaller spikelets mostly 1.8 mm. long, the first glume one-third as long as the spikelet, and broader, subcordate, pubescent blades.

This species was also collected on Mount Uyuca, Department of Morazán, Honduras, by Louis O. Williams and Antonio Molino R. (Nos. 12076 and 12142a).

PANICUM FURTIVUM Swallen, sp. nov.

Perenne (?); culmi erecti basi decumbentes, ca. 30 cm. longi, papilloso-pilosi, internodiis in parte superiore glabris; vaginae internodiis longiores vel breviores, pilosae vel papilloso-pilosae, suprema elongata; ligula ciliata ca. 0.5 mm. longa; laminae 3.5–4.5 cm. longae, 6–12 mm. latae, ovato-lanceolatae, acutae, pubescentes, marginibus scabrae, basi papilloso-ciliatae, subcordatae; panicula 5 cm. longa, 4 cm. lata, ramis adscendentibus, glabris, glandulosis; spiculae 2–2.1 mm. longae, 1 mm. latae, glabrae vel sparse pilosae; gluma prima spicula ⅔ brevior, triangularis, acuta vel subobtusa; gluma secunda et lemma sterile obtusa, fructum aequantia vel gluma fructu paulo brevior; fructus 1.8 mm. longus, 1 mm. latus, ellipticus, subacutus, minute striatus.

Perennial (?); culms erect from a decumbent base, about 30 cm. long, papillose-pilose, the upper part of the internodes glabrous or nearly so; sheaths longer or shorter than the internodes, pilose or papillose-pilose, especially along the margins and on the collar; ligule ciliate, about 0.5 mm. long; blades 3.5–4.5 cm. long, rarely less, 6–12 mm. wide, ovate-lanceolate, acute, softly pubescent on both surfaces, the whitish margins finely scabrous, papillose-ciliate toward the rounded subcordate base; panicle 5 cm. long, about 4 cm. wide, partly enclosed in the elongate upper sheath, the branches rather widely ascending, glabrous, more or less glandular spotted; spikelets 2–2.1 mm. long, 1 mm. wide, glabrous or very sparsely pilose, tinged with purple; first glume one-third as long as the spikelet, triangular, broadly acute or subobtuse; second glume and sterile lemma obtuse, as long as the fruit or the glume a little shorter exposing the tip of the fruit; fruit 1.8 mm. long, 1 mm. wide, broadly elliptic, subacute, minutely striate.

Type in the U. S. National Herbarium, No. 1935043, collected in thickets, between Quetzal and Barillas, Sierra de los Cuchumatanes, altitude 1,600–2,000 meters, Department of Huehuetenango, Guatemala, July 18, 1942, by Julian A. Steyermark (No. 49123).

Related to *Panicum viscidellum* Scribn., which has relatively longer, narrower blades, and smaller, more pointed spikelets mostly 1.8 mm. long. The axis of the panicle is pilose, and the branches implicate, the spikelets thus appearing to be crowded along the axis.

PANICUM ALSOPHILUM Swallen, sp. nov.

Perenne (?); culmi divergentes, ca. 50 cm. longi, papilloso-pilosi, nodis barbatis, internodiis plus minusve aequalibus; vaginae internodia aequantes vel superantes, papilloso-pilosae, in collo dense pubescentes; ligula ciliata, 0.3 mm. longa; laminae 5–10 cm. longae, 4–9 mm. latae, acuminatae, subtus papilloso-pilosae, supra papilloso-hispidae, marginibus scabris et papilloso-hispido-ciliatis; panicula 8 cm. longa, ramis divergentibus, paucifloris; spiculae 2.5 mm. longae, glabrae, vel gluma secunda sparse pilosa; gluma prima 0.5–1 mm. longa, enervis; gluma secunda et lemma sterile aequalia, fructu paulo longiora; fructus 2 mm. longus, ellipticus, subacutus, lucidus.

Perennial (?); culms spreading, about 50 cm. long, with nearly equal internodes, papillose-pilose with appressed or spreading hairs, the nodes more or less bearded; sheaths about as long as or longer than the internodes, papillose-pilose, densely pilose on the collar; ligule ciliate, 0.3 mm. long; blades 5–10 cm. long, 4–9 mm. wide, acuminate, rather conspicuously papillose-pilose below, papillose-hispid above, the margins scabrous and papillose-hispid-ciliate; panicle 8 cm. long, about as broad, the slender branches spreading, few-flowered; spikelets 2.4 mm. long, glabrous, or the second glume sparsely pilose; first glume 0.5–1 mm. long, nerveless; second glume and sterile lemma equal, covering the fruit; fruit 2 mm. long, elliptic, subacute, pale, shining.

Type in the Chicago Natural History Museum, No. 1043333, collected in oak woods around the top of Cerro Alcoba, just east of Jalapa, Department of Jalapa, Guatemala, altitude 1,700 meters, December 2, 1939, by Julian A. Steyermark (No. 32513).

PANICUM BLAKEI Swallen, sp. nov.

Annuum (?); culmi basi decumbentes, 15–28 cm. longi, pilosi, pilis divergentibus, nodis retrorse barbatis; vaginae internodiis subaequalibus breviores, papilloso-pilosae, in collo dense pilosae; ligula ciliata, 0.2–0.4 mm. longa; laminae 2.5–4.3 cm. longae, 5–10 mm. latae, lanceolatae, subcordatae, sparse pubescentes, marginibus ciliatae, suprema et eae ramorum paulo reductae; panicula 3.3 cm. longa, ramis gracilibus, rigide adscendentibus vel divergentibus, axillis pilosis; spiculae 1.5–1.6 mm. longae, 0.8 mm. latae, sparse pilosae; gluma prima 0.5 mm. longa, triangularis, 1-nervis; gluma secunda et lemma sterile aequalia fructum aequantia; fructus 1.4 mm. longus, 0.7 mm. latus, ellipticus, acutus, lucidus, minute striatus.

Annual (?); culms more or less decumbent spreading, 15–28 cm. long, pilose with spreading hairs, the nodes retrorsely bearded; sheaths mostly shorter than the nearly equal internodes, papillose-pilose, densely pilose on the collar; ligule ciliate, 0.2–0.4 mm. long; blades

2.5–4.3 cm. long, 5–10 mm. wide, lanceolate, clasping, sparsely pubescent, the margins ciliate nearly to the tip, the uppermost and those of the branches somewhat reduced; panicle 3.3 cm. long, nearly as wide, the slender branches stiffly ascending or spreading, the axis and axils pilose; spikelets 1.5–1.6 mm. long, 0.8 mm. wide, sparsely pilose; first glume 0.5 mm. long, triangular, 1-nerved; second glume and sterile lemma equal, just covering the fruit; fruit 1.4 mm. long, 0.7 mm. wide, elliptic, acute, straw-colored, shining, minutely striate.

Type in the U. S. National Herbarium, No. 1163068, collected along trail from Los Amates to Izabal, Cerro de Las Minas, Department of Izabal, Guatemala, May 31, 1919, by S. F. Blake (No. 7817).

PANICUM ALCOBENSE Swallen, sp. nov.

Annuum (?); culmi ca. 80 cm. longi, ramosi, pilosi, nodiis pubescentiubus; vaginae internodiis paulo breviores, glabrae, marginibus dense papilloso-ciliatae; ligula membranacea, ciliata, ca. 1 mm. longa; laminae 4–7.5 cm. longae, 5–8 mm. latae, subacuminatae, glabrae, marginibus scabris basi sparse papilloso-hispido-ciliatis; paniculae 4–6 cm. longae, 2–3 cm. latae, ramis adscendentibus, glabris vel scabris, inferioribus 1–2 cm. longis; spiculae 2.7 mm. longae, 1 mm. latae, sparse pubescentes; gluma prima 1–1.3 mm. longa, enervis; gluma secunda et lemma sterile aequalia, obtusa, fructu paulo breviora, gluma 7-nervis, lemma 5-nerve; fructus 2.2 mm. longus, 1 mm. latus, ovatus, laevis, lucidus.

Annual (?); culms about 80 cm. long, straggling, branching, pilose with appressed hairs, the nodes pubescent; sheaths mostly a little shorter than the internodes, glabrous, the margins densely papillose-ciliate; ligule a ciliate membrane about 1 mm. long including the hairs, blades 4–7.5 cm. long, 5–8 mm. wide, subacuminate, glabrous, the margins scabrous, sparsely papillose-hispid-ciliate at the base; panicles 4–6 cm. long, 2–3 cm. wide, the branches ascending, glabrous or scabrous, the lower ones 1–2 cm. long; spikelets 2.7 mm. long, 1 mm. wide, sparsely pubescent; first glume 1–1.3 mm. long, nerveless; second glume and sterile lemma equal, a little shorter than the fruit, obtuse, the glume 7–nerved, the lemma 5–nerved; fruit 2.2 mm. long, about 1 mm. wide, ovate, pale, smooth and shining.

Type in the Chicago Natural History Museum, No. 1040005, collected in oak wood around top of Cerro Alcoba, just east of Jalapa, Department of Jalapa, Guatemala, altitude 1,700 meters, December 2, 1939, by Julian A. Steyermark (No. 32515).

PANICUM RAMIPARUM Swallen, sp. nov.

Perenne; culmi erecti vel decumbentes, 55–60 cm. alti, sparse vel dense pilosi vel papilloso-pilosi, nodis barbatis; vaginae internodiis

breviores, dense pilosae, pilis divergentibus; ligula ciliata, 0.5 mm. longa; laminae 5–9 cm. longae, 7–13 mm. latae, lanceolato-acuminatae, sparse pubescentes, basi supra longe pilosae; paniculae 7–9 cm. longae, 3–6 cm. latae, ramis adscendentibus vel superioribus divergentibus, glabris, sparse glandulosis; spiculae 2.2–2.4 mm. longae, glabrae; gluma prima ca. 0.8 mm. longa; gluma secunda et lemma sterile obtusa, gluma fructum aequans, lemma sterile fructu paulo brevius; fructus 1.8 mm. longus, 1 mm. latus, ellipticus, subacutus, albus, minute striatus.

Perennial; culms erect, or decumbent at the base, 55–60 cm. tall, sparsely to rather densely pilose or papillose-pilose, the nodes bearded; sheaths mostly shorter than the internodes, densely pilose with spreading hairs, the margins rather conspicuously ciliate; ligule ciliate, 0.5 mm. long; blades mostly 5–9 cm. long, 7–13 mm. wide, lanceolate-acuminate, sparsely pubescent on both surfaces with long hairs on the upper surface at the base; panicles 7–9 cm. long, 3–6 cm. wide, the branches stiffly ascending, or the upper spreading, glabrous, very sparsely and obscurely glandular spotted; spikelets 2.2–2.4 mm. long, glabrous; first glume about 0.8 mm. long; second glume and sterile lemma obtuse, the glume as long as the fruit, the sterile lemma a little shorter; fruit 1.8 mm. long, 1 mm. wide, elliptic, acutish, white, minutely striate.

Type in the U. S. National Herbarium, No. 1914983, collected in mountains near Santa María, south of Quezaltenango, Department of Quezaltenango, Guatemala, March 25, 1932, by Paul Weatherwax (No. 160).

The four preceding species are decumbent or straggling, branching, annuals or perennials, apparently related to the subgenus *Dichanthelium*. They do not have, however, a winter rosette, and the leaves of the branches are not much reduced.

PANICUM HISPIDIFOLIUM Swallen, nom. nov.

Panicum hispidum Swallen, Contr. U. S. Nat. Herb. **29**: 269. 1949. Not *P. hispidum* Forst. 1786.

PANICUM SUBLAEVE Swallen, nom. nov.

Panicum rigidum Swallen, Ann. Missouri Bot. Gard. **30**: 215. 1943. Not *P. rigidum* Baltf. 1884.

ICHNANTHUS SCABERRIMUS Swallen, sp. nov.

Perennis; culmi suberecti vel decumbentes, ca. 65 cm. longi, ramosi, glabri; vaginae internodiis multo breviores, margines versus papilloso-pilosae, collo pilosae; ligula 0.4 mm. longa, truncata, plus minusve ciliata; laminae 6–12 cm. longae, 7–14 mm. latae, lanceolatae, acumi-

natae, nervosae, subtus glabrae, supra et marginibus scaberrimae; paniculae 6–11 cm. longae, 4–5 cm. latae, ramis rigide adscendentibus vel divergentibus, ramulis divaricatis; spiculae 3–3.4 mm. longae, appressae; gluma prima acuminata vel attenuata spiculam aequans vel paulo brevior, 3-nervis, in carina scabra; gluma secunda et lemma sterile subaequalia, 5-nervia, gluma abrupte acuta vel acuminata, lemma plus minusve cucullatum; fructus 2.2 mm. longus, 1.2 mm. latus, ovatus, subacutus, alis cicatricibus 0.5 mm. longis reductis.

Perennial; culms somewhat woody, suberect or decumbent, about 65 cm. long, branching, glabrous; sheaths much shorter than the internodes, papillose-pilose near the margins, the collar pilose; ligule 0.4 mm. long, truncate, more or less ciliate; blades 6–12 cm. long, 7–14 mm. wide, lanceolate, acuminate, strongly nerved, the nerves approximate, glabrous or somewhat scabrous beneath, prominently scabrous above and on the margins; panicles 6–11 cm. long, 4–5 cm. wide, the branches stiffly ascending or spreading, the branchlets divaricate; spikelets 3–3.4 mm. long, appressed; first glume acuminate or attenuate, as long as the spikelet or somewhat shorter, 3-nerved, scabrous on the keel; second glume and sterile lemma subequal, 5-nerved, the glume abruptly acute or acuminate, the lemma blunt somewhat cucullate; fruit 2.2 mm. long, 1.2 mm. wide, ovate, subacute, straw-colored, the wings reduced to scars, the scars 0.5 mm. long.

Type in the U. S. National Herbarium, No. 1764414, collected in damp thicket, Finca Pirineos, below Santa María de Jesús, Department of Quezaltenango, Guatemala, March 11, 1939, by Paul C. Standley (No. 68296).

In spikelet characters, this species resembles *Ichnanthus nemorosus* (Swartz) Doell but is readily distinguished by the much coarser plants and the lanceolate, firm, very scabrous blades.

ICHNANTHUS NUBIGENUS Swallen, sp. nov.

Perennis; culmi graciles, procumbentes, ramosi, radicantes, sparse pilosi; vaginae internodia aequantes, sparse vel dense pilosae; ligula membranacea, ciliata, 0.5 mm. longa; laminae lanceolatae, 3–5.5 cm. longae, 4–6 mm. latae, glabrae vel sparse pilosae; inflorescentia 3–5 cm. longa, breviter exserta; racemi 3–5, usque ad 1.8 cm. longi, rigide adscendentes, pauciflori, in axilla pilosi; spiculae 4.5 mm. longae, solitariae vel binae, appressae; glumae subaequales, prima attenuata, 3–5-nervis, secunda acuminata, 5-nervis; lemma sterile glumis paulo brevior, cucullatum, 5-nerve; fructus 2.5 mm. longus, ellipticus, subobtusus, alis reductis.

Perennial; culms slender, straggling, branching, rooting at the nodes, sparsely pilose, the ascending ends about 15 cm. high; sheaths about as long as the internodes, sparsely to rather densely pilose, espe-

cially along the margins; ligule a minutely ciliate membrane 0.5 mm. long; blades lanceolate, 3–5.5 cm. long, 4–6 mm. wide, glabrous or sparsely pilose; inflorescense 3–5 cm. long, short exserted, composed of 3–5 stiffly ascending few-flowered racemes, the axis pilose, the lowermost raceme as much as 1.8 cm. long, pilose in the axils; spikelets 4.5 mm. long, solitary or paired, rather distant, appressed, pale or purple; glumes nearly equal, the first attenuate, 3–5-nerved, the second acuminate, 5-nerved; sterile lemma a little shorter than the glumes, cucullate, 5-nerved; fruit 2.5 mm. long, elliptic, blunt, smooth and shining, the wings reduced to scars.

Type in the U. S. National Herbarium, No. 1935397, collected in cloud forest on Mount Uyuca, Department of Morazán, Honduras, altitude 2,000 meters, March 2, 1947, by Louis O. Williams and Antonio Molina R. (No. 12143).

This species resembles and is related to *Ichnanthus tenuis* (Presl) Hitchc. & Chase, which differs in having smaller and narrower spikelets mostly 3–3.5 mm. long and long-exserted terminal and axillary, glabrous racemes.

ISACHNE PUBESCENS Swallen, sp. nov.

Perenne (?); culmi scandentes, ramosi, infra paniculam pubescentes; vaginae internodia subaequantes, papilloso-pilosae, marginibus ciliatae; ligula ciliata, 2–3 mm. longa; laminae 7–16 cm. longae, 10–14 mm. latae, acuminatae, subtus velutinae, supra papilloso-pilosae; paniculae 11–12 cm. longae, 4 cm. latae, axis et rami dense pilosi pilis appressis, rami adscendentes, e basi ramosi; spiculis nonaggregatis; spiculae 1.9–2 mm. longae; glumae aequales flore primo breviores et angustiores, summo pilosae pilis appressis; flos inferior 1.8 mm. longus, marginibus sparse pilosus; flos superior 1 mm. longus subglobularis; rachilla summo breviter pilosa.

Perennial (?); culms scandent or clambering, branching, pubescent below the panicle; sheaths about as long as the internodes, rather densely papillose-pilose, the margins conspicuously ciliate; ligule composed of hairs 2–3 mm. long; blades 7–16 cm. long, mostly 10–14 mm. wide, acuminate, velvety pubescent, papillose-pilose above; panicles 11–12 cm. long, about 4 cm. wide, the axis and branches rather densely appressed-pilose, the branches ascending, branching from near the base, rather evenly flowered, the spikelets not clustered toward the ends of the branchlets; spikelets 1.9–2 mm. long, the glumes equal, shorter and narrower than the first floret, sparsely appressed-pilose toward the summit; first floret 1.8 mm. long, sparsely pilose on the margins; second floret 1 mm. long, subhemispheric, the rachilla joint short-pilose at the summit.

Type in the U. S. National Herbarium, No. 472909, collected in the vicinity of Secanquim, altitude 550 meters, Department of Alta Verapaz, Guatemala, May 6, 1905, by H. Pittier (No. 252).

The type specimen has been referred previously to *I. arundinacea* (Swartz) Griseb., which differs in having nearly glabrous foliage, glabrous panicle branches, smaller spikelets 1.5–1.8 mm. long clustered toward the ends of the branches, and a short inconspicuous ligule.

ANDROPOGON SEMITECTUS Swallen, sp. nov.

Annuus; culmi erecti, 21–55 cm. alti, glabri, nodis superioribus ramosi, internodiis aequalibus; vaginae internodiis ½ breviores, carinatae, glabrae; ligula 0.5 mm. longa, minute ciliata; laminae 4–9 cm. longae, 1.5–3 mm. latae, planae vel conduplicatae, supra ad basin papilloso-pilosae, marginibus scabrae; spathae 2.5–3.5 cm. longae; racemi solitarii, breve pedunculati, vaginati; rachis et pedicelli steriles lati, tenues, in parte inferiore villosi; spicula sessilis 6 mm. longa, angusta; glumae acuminatae, prima in parte inferiore dense villosa; lemma fertile 2.5 mm. longum, arista 14 mm. longa, praeditum, hac supra basin 1/3 inserta, geniculata, infra geniculam contorta; spicula pedicellata multum reducta, arista recta, scabra, 3–5 mm. longa praedita.

Annual; culms erect, 21–55 cm. high, glabrous, with flowering branches from the middle and upper nodes, all the internodes of about equal length; sheaths about half as long as the internodes, keeled, glabrous; ligule 0.5 mm. long, minutely ciliate; blades mostly 4–9 cm. long, 1.5–3 mm. wide, flat or folded, papillose-pilose on the upper surface toward the base with long hairs, the margins scabrous; spathes 2.5–3.5 cm. long; racemes solitary, mostly included, only the uppermost spikelets exserted from the spathe, the peduncle very short; rachis joints and sterile pedicels broad but rather thin, lunate in cross sections, densely villous on the lower part of the back, the upper part glabrous, the rachis joint somewhat widened at the summit with thin almost wing-like margins, the tip cup-shaped; sessile spikelet 6 mm. long, narrow, the glumes acuminate, the first densely villous in the lower half; lemma 2.5 mm. long, awned, the awn inserted one-third from the base, 14 mm. long, tightly twisted below, geniculate, the twisted part dark brown, 6 mm. long; pedicellate spikelet greatly reduced, scabrous, bearing a slender straight scabrous awn 3–5 mm. long.

Type in the U. S. National Herbarium, No. 1910596, collected in arenal, Baños de Santa Marta, north of Zacapa, altitude about 200 meters, Department of Zacapa, Guatemala, October 10, 1910, by Paul C. Standley (No. 73919).

Rather closely allied to *Andropogon malacostachys* Presl, which differs in being usually shorter and not so slender and having more conspicuously villous racemes, the rachis joints and sterile pedicels

villous throughout with shorter hairs, and the pedicellate spikelets mostly narrower, 2–3 mm. long. The blades also lack the long hairs on the upper surface.

SORGHASTRUM BRUNNEUM Swallen, sp. nov.

Perenne; culmi erecti, 115 cm. alti, glabri, nodis dense breviter barbatis; vaginae elongatae, internodiis longiores, glabrae vel marginibus sparse pilosae; ligula 3–3.5 mm. longa, ciliata, decurrens; laminae 15–30 cm. longae, 5–6 mm. latae, scabrae; paniculae 20 cm. longae, ramis flexuosis, fasciculatis, distantibus, glabris vel plus minusve scabris, inferioribus usque ad 7 cm. longis; spiculae 5–6 mm. longae, brunneae, sparse vel dense hispidae pilis albis; glumae obtusae, prima secunda paulo brevior, apice ciliatae; lemma fertile bifidum, glabrum, eciliatum, inter dentes aristatum; arista 13–16 mm. longa, bigeniculata, infra geniculam secundam contorta, hispida, supra recta, scabra; antherae 2 mm. longae.

Perennial; culms erect, 115 cm. high, glabrous, the nodes densely short-bearded; sheaths elongate, mostly longer than the internodes, glabrous, or sparsely pilose on the margins; ligule 3–3.5 mm. long, ciliate, decurrent; blades 15–30 cm. long, 5–6 mm. wide, scabrous; panicle 20 cm. long, the flexuous branches in distant fascicles, the lowermost as much as 7 cm. long, with short ones intermixed, pilose in the axils, glabrous or somewhat scabrous; spikelets 5–6 mm. long, chestnut brown, sparsely to rather densely hispid with white hairs; glumes obtuse, the first a little shorter than the second, the tip ciliate; fertile lemma awned from between the teeth of the rather deeply bifed apex, glabrous, not ciliate, the awn 13–16 mm. long, twice geniculate, tightly twisted below the second bend, hispid, the terminal segment straight or nearly so, scabrous; anthers 2 mm. long.

Type in the U. S. National Herbarium, No. 1910682, collected in oak forest, in mountains west of Aguacatán, on road to Huehuetenango, Department of Huehuetenango, Guatemala, altitude 1,950 meters, December 27, 1940, by Paul C. Standley (No. 81290).

This species is probably most closely related to *Sorghastrum elliottii* (Mohr) Nash, which has larger spikelets, 7–8 mm. long, and longer awns, 25–30 mm. long.

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FROM THE

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VOLUME 29, PART 10

STUDIES IN THE BROMELIACEAE, XVI

By LYMAN B. SMITH

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PREFACE

THIS paper, by Lyman B. Smith, associate curator of the Department of Botany, U. S. National Herbarium, is the sixteenth of his series of studies of the family Bromeliaceae, the fifteenth having been published as volume 29, part 7, in the "Contributions from the United States National Herbarium." The first part of the paper contains a miscellany of noteworthy records, including 14 new species. The second part is a continuation of a synopsis of the Tillandsieae and includes two new species. All new species are illustrated.

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STUDIES IN THE BROMELIACEAE, XVI [1]

By Lyman B. Smith

INTRODUCTION

The present paper consists of two parts, the first being a miscellany of preliminary records of species for which there is no immediate prospect of inclusion in any floristic or monographic treatment, and the second a continuation of a synopsis of the Tillandsieae.

Thanks are tendered to those in charge of the following herbaria for the opportunity to examine their material: The Bailey Hortorium (Bailey Hort.); the British Museum (Natural History) (BM); the Jardin Botanique de l'État, Brussels (BR); the Dudley Herbarium of Stanford University (DS); the private herbarium of José Pérez Carabia (Carabia); the Chicago Natural History Museum (formerly the Field Museum) (F); the Gray Herbarium of Harvard University (GH); the Herbario Nacional de Colombia, Bogotá (Hb. Nac. Colomb.); the Jenman Herbarium of the Botanic Gardens, Georgetown, British Guiana (Jenman); the Royal Botanic Gardens, Kew (K); the Institut et Jardin Botanique, Liége, Belgium (Liége); the private herbarium of Cyrus Longworth Lundell (Lundell); the University of Michigan (MICH); the Missouri Botanical Garden (MO); the Botanisches Museum, Munich (M); the Museu Nacional, Rio de Janeiro (Mus. Nac. Rio); the New York Botanical Garden (NY); the Muséum d'Histoire Naturelle, Paris (P); Pomona College (POM); the Riksmuseet, Stockholm (S); the Instituto de Botânica, São Paulo, Brazil (SP); the Department of Agriculture, Port-of-Spain, Trinidad (TRIN); the University of California (UC); the United States National Museum (US); the University of Tennessee (U. Tenn.); and the Estacíon Experimental Agronómica, Santiago de las Vegas, Cuba (Vegas). Material from other herbaria has been considered on the basis of descriptions and photographs.

PRELIMINARY NOTES

The miscellaneous records are arranged geographically, since their chief use will be in floristic works. However, one matter of general

[1] Number XV of this series, "Studies in the Bromeliaceae," was published in Contr. U. S. Nat. Herb. **29** (7) 1949.

systematic significance is distributed under the various geographic headings, namely the transfer to *Vriesia* of all species of *Tillandsia* with appendaged petals.

Mez's distinction of lateral folds against scales [2] has served to keep several species in *Tillandsia* where their habit seems more appropriate. The difference, however, is one of proportion only, the lateral fold being simply a scale in which the attached central portion is so long that its lateral free margins are more noticeable than the apical flap. In most of the previously recognized species of *Vriesia* the free apical part of the scale is conspicuous and the attached part relatively short, but intergradations between the two extremes are frequent.

MEXICO

Aechmea matudai L. B. Smith, sp. nov. FIGURE 37

Planta verisimiliter metralis, a *Ae. sprucei* Mez, cui affinis, pilis inflorescentiae crispatis, floribus subduplo majoribus, sepalis longe spinosis differt.

Probably about a meter high; leaf 6 dm. long, wholly covered by a membrane of pale coalesced scales, sheath conspicuous, nearly as long

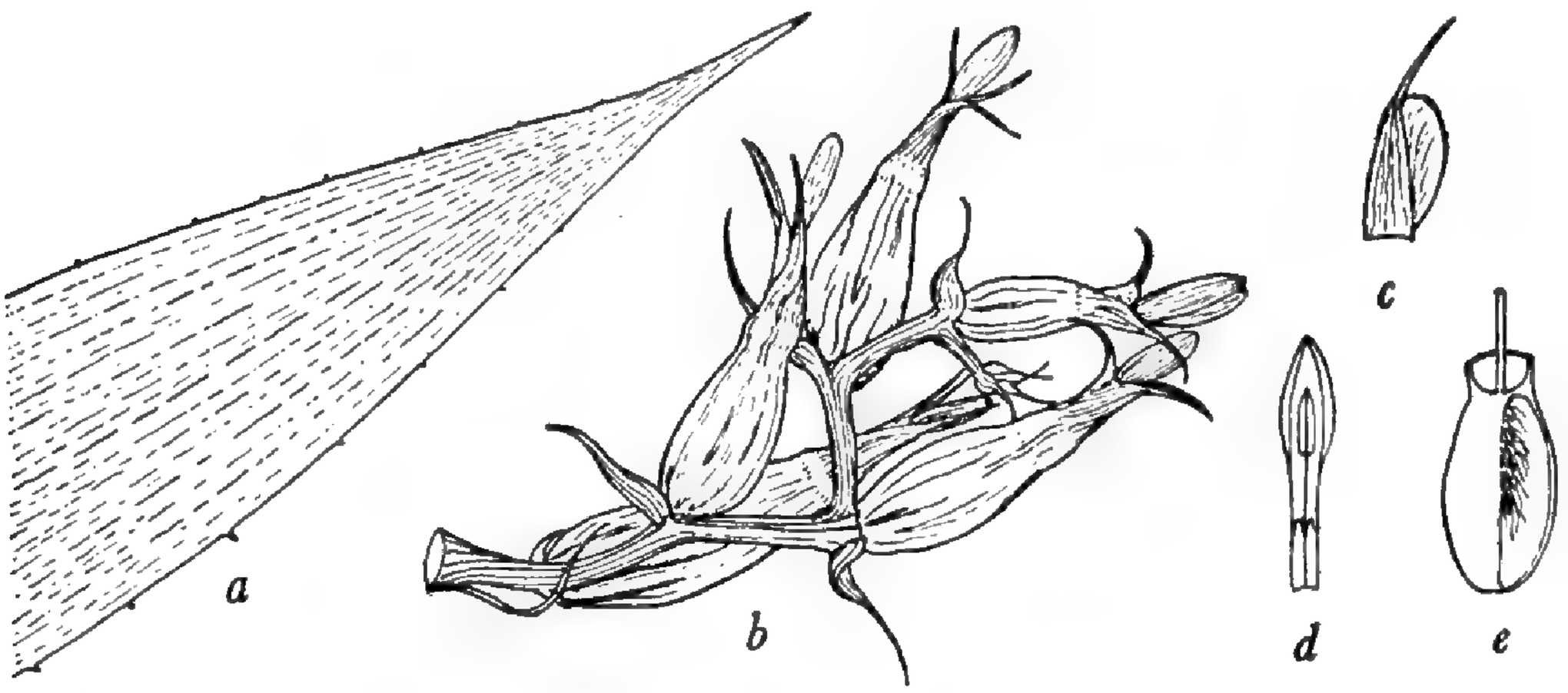

FIGURE 37.—*Aechmea matudai: a*, Apex of scape-bract, ×1; *b*, branch of inflorescence, ×1; *c*, sepal, ×1; *d*, petal, ×1; *e*, longitudinal section of ovary, ×1.

as the blade, elliptic, blade ligulate, broadly rounded and apiculate, 9.5 cm. wide, subdensely serrate with dark teeth 2 mm. long; scape erect, sulcate, white-flocculose, becoming glabrous; scape-bracts (only the upper ones known) lanceolate, acuminate to a pungent apex, 15–16 cm. long, serrulate, subchartaceous when dry, rose, flocculose at base; inflorescence laxly bipinnate, cylindric, acuminate, 4 dm. long, 10–12 cm. in diameter, white-flocculose; lowest primary bracts like the scape-bracts, much exceeding the axillary branches, changing abruptly to primary bracts exactly like the floral bracts in size and

[2] Mez in DC. Monogr. Phan. **9**: 634, 783. 1896.

shape; branches spreading, simple, geniculate, slender, 2–4–flowered, often bearing a tuft of sterile bracts at apex; floral bracts narrowly triangular, subulate-acuminate, 8–10 mm. long; flowers sessile, spreading, soon glabrous; sepals nearly free, strongly asymmetric, 10 mm. long exclusive of the 5–7 mm. long mucro; petals 15 mm. long, red-purple when dry, bearing two lacerate scales well above the base; stamens included; ovary ellipsoid, epigynous tube 2 mm. high, ovules long-caudate, borne on the upper half of the axis.

Type in the Chicago Natural History Museum, collected at Esperanza, Escuintla, state of Chiapas, Mexico, November 27, 1947, by E. Matuda (No. 17308).

At first glance *Aechmea matudai* seems to be only a large specimen of *Ae. sprucei* Mez, but its sepals have a mucro proportionately much larger and its inflorescence lacks the simple bristlelike trichomes that are so striking in *Ae. sprucei*. The nearest North American relative of *Ae. matudai* is *Ae. iguana* Wittm., but the latter has an amply tripinnate inflorescence.

The following specimen is certainly conspecific:

MEXICO:

CHIAPAS: Acacoyagua, Sept. 28, 1947, *E. Matuda* 17009 (F).

Hechtia tillandsioides (André) L. B. Smith, comb. nov.

Bakeria tillandsioides André, Rev. Hort. **61**: 84, *pl.* 1889.

Hechtia purpusii Brand. Univ. California Publ. Bot. **7**: 325. 1920; L. B. Smith, Contr. Gray Herb. **117**: 14. 1937.

Bakerantha tillandsioides L. B. Smith, Contr. Gray Herb. **104**: 72. 1934.

TYPE LOCALITY: "Colombia." Type collected by E. André from cultivated material.

DISTRIBUTION: Mexico.

MEXICO: *André* K386 (K, type). Cultivated, June 1950, *Foster* 2734 (US).

HIDALGO: Alt. 150 m., cultivated and flowered July 1939, *Halbinger* (GH).

VERA CRUZ: On steep rocks, Barranca de Tenampa, 1919, *Purpus* 8420 (♀ UC, type of *Hechtia purpusii* Brandegee; GH, US). Paso de la Milpa, Jalapa, 1884, *Com. Geogr. Explor. Rep. Mex.* 224 (♂F).

Because of the supposed Colombian origin and apparently perfect flowers of the monotypic genus *Bakeria* or *Bakerantha*, its identity with the strictly North American genus *Hechtia* long went unsuspected. Now it is evident that the "Colombia" was just another of those confusions so frequent in the description of novelties from horticultural material. The functional dioecism of the flowers is shown in comparing the large stamens and reduced ovary of *Bakerantha* with the minute stamens and large ovary of the type of *Hechtia purpusii*.

I am indebted to Dr. Ernest Rouleau for a careful comparison of type material of *Bakeria tillandsioides* and *Hechtia purpusii*. According to description, *Bakeria tillandsioides* is supposed to have entire leaves. However, Dr. Rouleau notes that they are serrated but that the margin is often covered with a mucilaginous border, so that on superficlia

examination they appear entire. While this note was in preparation, Mulford B. Foster sent in a freshly flowering specimen from the cultivated stock of *Bakeria*, which I supposed had long ago died out. It fully confirms the above notes in all details.

COLOMBIA

Bakerantha L. B. Smith, Contr. Gray Herb. **104:** 72. 1934.

This genus becomes a synonym of *Hechtia*. See under Mexico: *Hechtia tillandsioides* (p. 431).

Pitcairnia calophylla L. B. Smith, sp. nov. FIGURE 38

A *P. longipede* Mez, *P. spectabili* Mez, et *P. laxissima* Baker quibus affinis, foliorum laminis amplissimis, bracteis florigeris maximis (eis *P. laxissimae* ignotis), pedicellis minoribus differt.

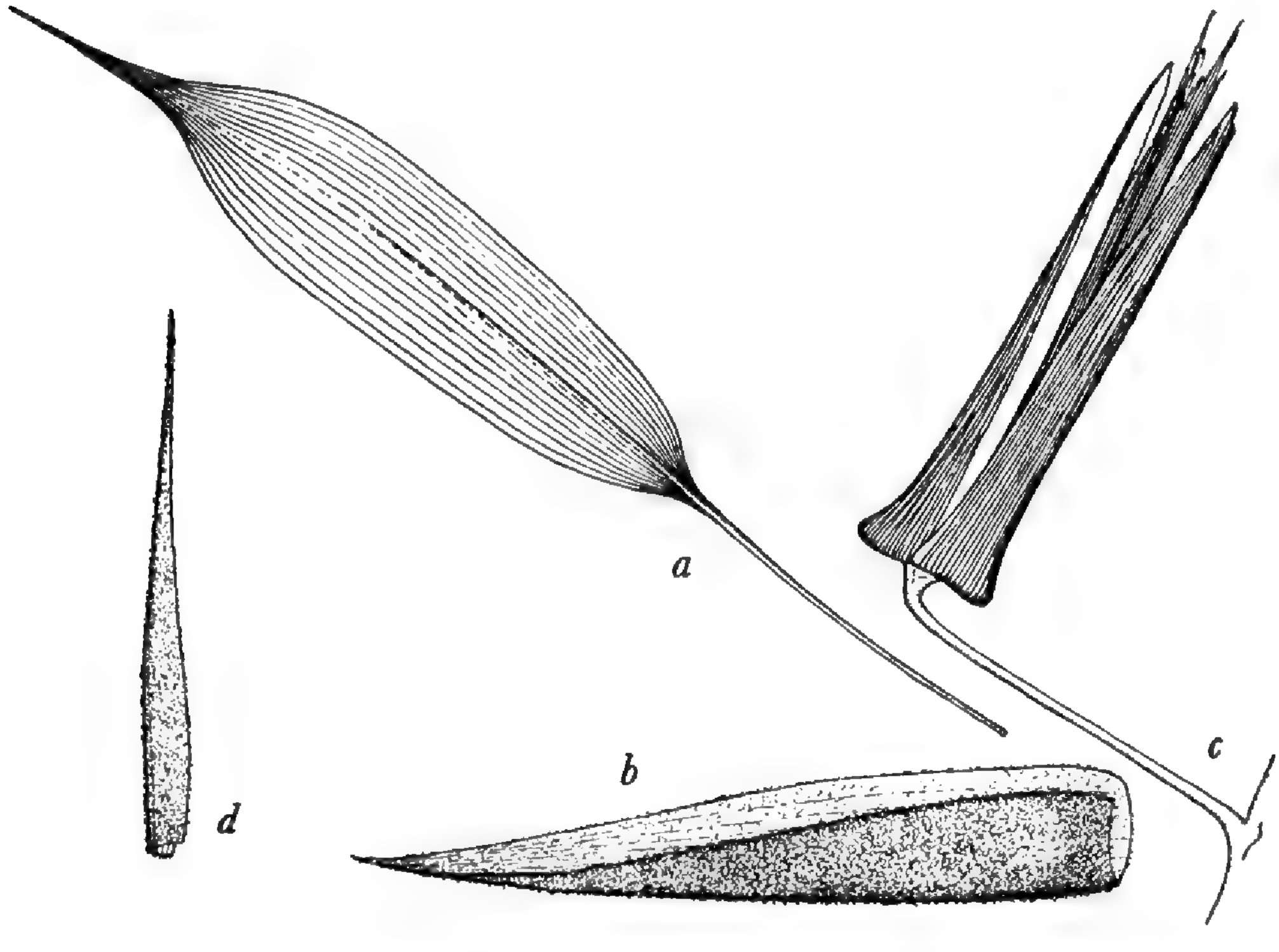

FIGURE 38.—*Pitcairnia calophylla: a*, Leaf, ×1/10; *b*, floral bract, ×1; *c*, old flower, ×1; *d*, young sepal, ×1.

Terrestrial, nearly 2 m. high (! Foster); leaf (only one known) 12 dm. long (! Foster), entire, sheath not seen, petiole slender, elongate, blade oblanceolate, abruptly acuminate, 7 dm. long, 14 cm. wide, channeled in the center, dark green above, deep maroon beneath; scape erect, 1 cm. in diameter; scape-bracts unknown; inflorescence simple, lax, elongate; floral bracts lance-ovate, acute, 65 mm. long, exceeding the pedicels, entire, thin, densely ferruginous-flocculose; pedicels spreading, slender, to 35 mm. long; flowers erect, at right

angles to the pedicels; sepals narrowly lanceolate, acuminate, 47 mm. long, carinate toward base, densely ferruginous-flocculose; ovary four-fifths superior.

Type in the Gray Herbarium, collected above El Diviso, Department of Nariño, Colombia, altitude 705 meters, November 13, 1946, by M. B. and R. Foster (No. 2159).

Unfortunately *Pitcairnia calophylla* was discovered when only extremely young and old inflorescences were available. However, such characters as can be ascertained mark the species as most unusual. The leaves, which are reminiscent of certain Marantaceae, are among the most striking and handsome in *Pitcairnia*.

Pitcairnia petraea L. B. Smith, sp. nov. FIGURE 39

A *P. guaritermae* André, cui affinis, statura triplo maiore, sepalis minoribus, apiculatis, petalis viridi-albis differt.

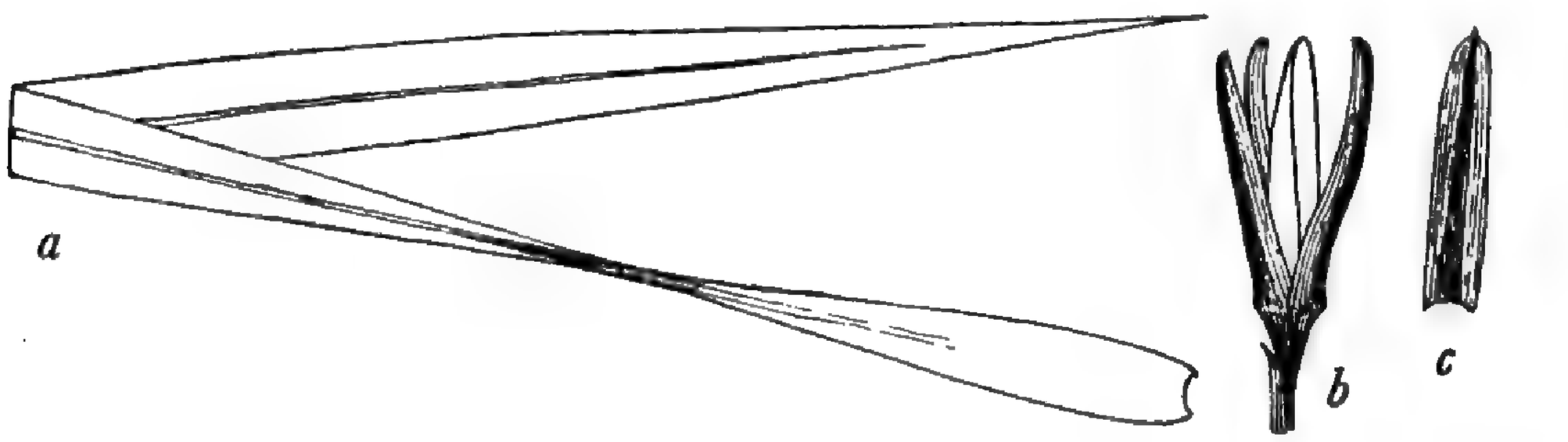

FIGURE 39.—*Pitcairnia petraea: a*, Leaf, ×1/10; *b*, floral bract and flower, ×1; *c*, sepal, ×1

Flowering plant over 2 m. high; leaves all alike, 1.5 m. long, entire, narrowed between sheath and blade but not petiolate, sheaths narrowly triangular, elongate, densely brown-flocculose when young, blades linear-lancelolate, acuminate, to 5 cm. wide (! Foster), brown-flocculose beneath, becoming glabrous; scape erect, about 1 cm. in diameter; scape-bracts subfoliaceous, the lower imbricate, the upper remote; inflorescence simple, subdense, many-flowered, 20–25 cm. long (! Foster); floral bracts narrowly triangular, about equaling the lower pedicels; flowers spreading; pedicels slender, up to 9 mm. long in fruit; sepals oblong, rounded-apiculate, ecarinate, 15 mm. long, nerved, glabrous, green (! Foster); petals at least 2 cm. long, greenish white (! Foster); stamens included; ovary two-thirds superior; fruit dehiscent; seeds long-caudate.

Type in the Gray Herbarium, collected on rocks at the Paramo de San Miguel, Department of Cundinamarca, Colombia, altitude 3,300 meters, October 12, 1946, by M. B. and R. Foster (No. 1877).

The above description was drawn from a nearly complete but very old specimen plus several quite young individual flowers.

Pitcairnia similis L .B. Smith, sp. nov. FIGURE 40

Inflorescentia cum ea *Pitcairnia multiflorae* L. B. Smith persimilis sed foliis basi valde serratis et foliorum laminis lineari-lanceolatis differt.

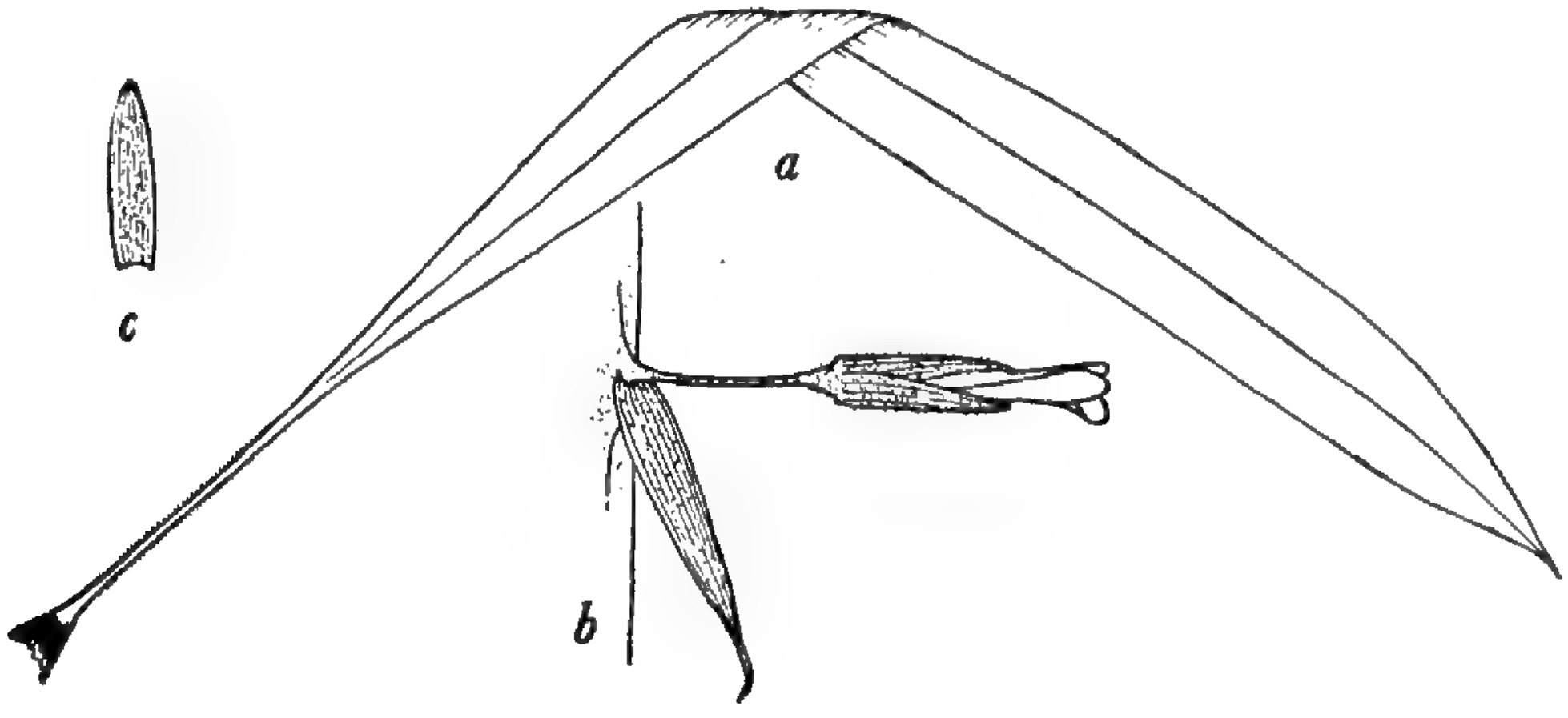

FIGURE 40.—*Pitcairnia similis: a,* Leaf, ×1/10; *b,* floral bract and flower, ×1; *c,* sepal,×1.

Terrestrial, aggregated; leaf (only one known) petiolate, 1.3 m. long, sheath small, dark castaneous, petiole stout, elongate, subdensely serrate with dark uncinate spines 2–3 mm. long, covered with a pale brown membrane of coalesced scales, blade linear-lanceolate, acuminate, cuneate, 9 cm. wide; scape erect, 15 mm. in diameter at base; scape-bracts imbricate, the lowest subfoliaceous but entire, the others lanceolate, acute or acuminate, closely enfolding the scape, thin, glabrous; inflorescence erect, simple, slenderly cylindric, 5 dm. long, subdense, many-flowered, bearing a small coma of sterile bracts at apex, sparsely pale-flocculose; floral bracts reflexed, narrowly lanceolate, acuminate, membranaceous, red, longer than the pedicels; flowers spreading, pale yellow (! Cuatrecasas); pedicels very slender, 11 mm. long; sepals lance-oblong, acute, 12 mm. long; petals 17 mm. long, naked; stamens included; ovary four-fifths superior; ovules caudate.

Type in the Gray Herbarium, collected at Monte La Guarida, crest of the Cordillera Occidental above La Carbonera (between Las Brisas and Albán), Department of El Valle, Colombia, altitude 1,950–2,000 meters, October 18, 1946, by J. Cuatrecasas (No. 22262).

Tillandsia acuminata L. B. Smith, sp. nov. FIGURE 41

A *T. rubella* Baker, cui affinis, foliis majoribus, ad apicem versus acuminatis, inflorescentia ample tripinnatim paniculata, bracteis florigeris laevibus differt.

Epiphytic, 1.5–2 m. tall (! Foster), presumably stemless; leaves 7.5–10 dm. long, obscurely punctulate-lepidote; sheaths elliptic; blades ligulate, acuminate, flat, 55 mm. wide; scape erect; scape-bracts imbricate, coiling-recurved toward their apices (! Foster);

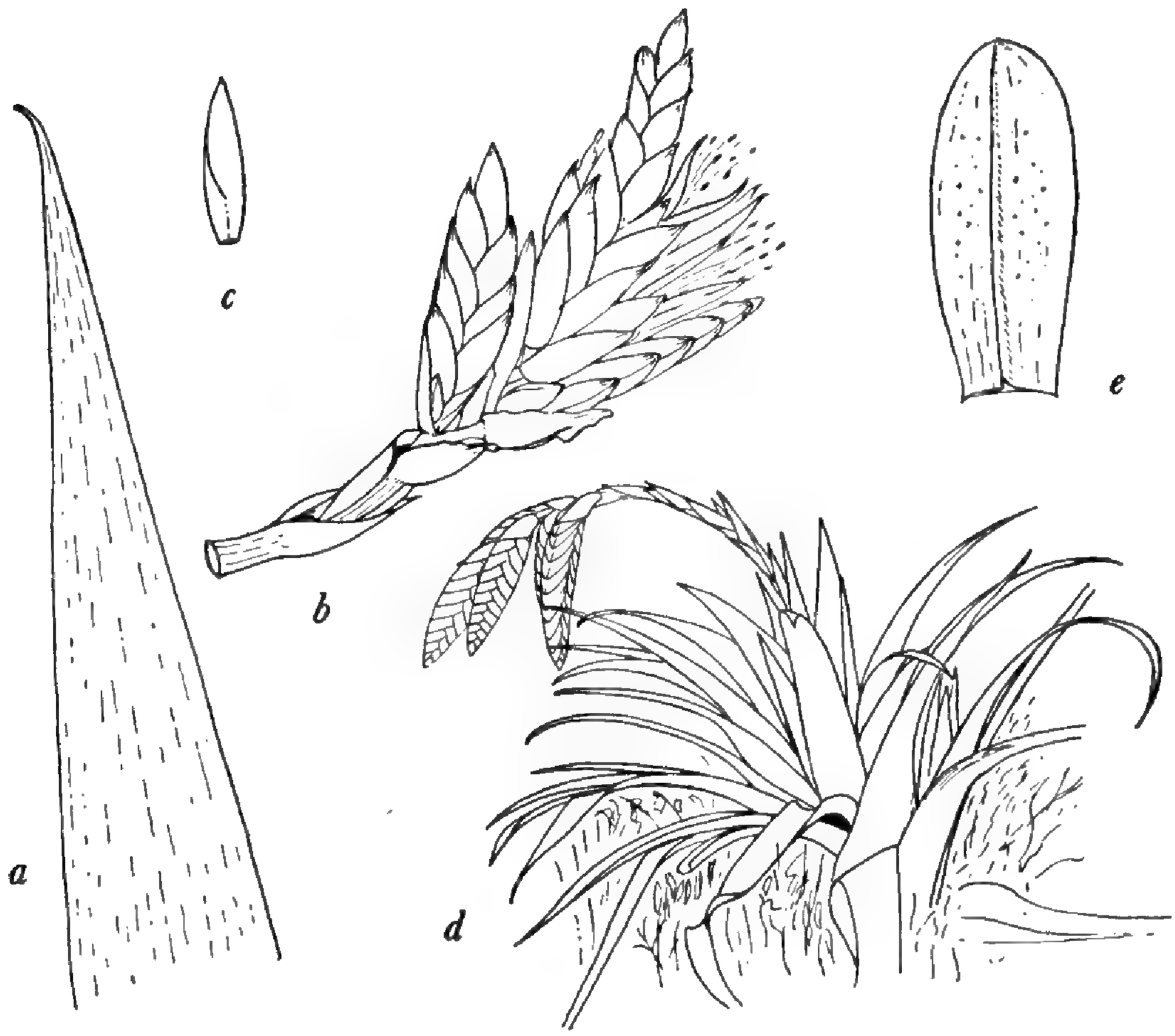

FIGURE 41.—*Tillandsia acuminata: a*, Apex of leaf, ×1/2; *b*, branch of inflorescence, ×1/2; *c*, posterior sepals, ×1. *Tillandsia arcuans: d*, Habit, ×1/10; *e*, sepal, ×1.

inflorescence thyrsoid, amply tripinnate throughout, nearly glabrous; primary bracts elliptic, barely exceeding the sterile bases of the branches; branches ascending, bearing several small sterile bracts at base and a digitate cluster of 5–7 spikes at apex; spikes strict, lance-oblong, acute, 5–7 cm. long, 15 mm. wide, strongly complanate, densely 8–13-flowered; floral bracts distichous, broadly elliptic, acute, carinate, 17 mm. long, equaling or exceeding the sepals, coriaceous, even, sublustrous, castaneous with buff margins when dry; pedicels short and stout; sepals ovate, 13–15 mm. long, free, coriaceous, even, the posterior ones carinate; petals and stamens unknown; capsule cylindric, acute, about 3 cm. long.

Type in the Gray Herbarium, collected in rain-forest in the mountains above Hacienda Cincinnati, Santa Marta, Department of Magdalena, Colombia, altitude 2,100 meters, August 3, 1946, by M. B. and R. Foster and E. Smith (No. 1402).

ADDITIONAL SPECIMEN EXAMINED:

COLOMBIA:

MAGDALENA: Dense rain-forest, mountains above Hacienda Cincinnati, Santa Marta, alt. 2,100 m., Aug. 3, 1946, *M. B. & R. Foster & E. Smith* 1406 (GH).

The inflorescence of *Tillandsia acuminata* resembles that of *T. rubella* Baker of Bolivia, but is more richly branched. Heretofore

the inflorescence of *T. rubella* has been described as bipinnate but it is definitely tripinnate in well-developed specimens, including some in the type collection.

Tillandsia arcuans L. B. Smith, sp. nov. FIGURE 41

A *T. lajense* André, cui affinis, inflorescentia densa, spicis oblongis, longioribus differt.

Stemless, 6–8 dm. high with the inflorescence extended; leaves numerous in a crateriform rosette, over 5 dm. long, covered with appressed cinereous brown-centered scales; sheaths elliptic, 25 cm. long, 10 cm. wide, deep maroon (! Foster); blades narrowly triangular, acuminate, flat, 5 cm. wide, green; scape arching-decurved, 15 mm. thick; scape-bracts densely imbricate, the lower foliaceous, the upper elliptic, deep maroon, bearing a short acuminate recurved green blade; inflorescence few-branched, compact; primary bracts like the upper scape-bracts, many times shorter than the axillary spikes; spikes secund-pendulous, lance-oblong, acute, strongly complanate, 17 cm. long, 4–5 cm. wide, densely 13–17-flowered; floral bracts imbricate, broadly elliptic, acute, 4 cm. long, exceeding the sepals, carinate, coriaceous, glabrous, lustrous, yellow-green with maroon-red margins (! Foster); pedicels stout, 4 mm. long; sepals elliptic, 32 mm. long, free, carinate, thin-coriaceous, sparsely lepidote; petals 6 cm. long, the blade deep purple (! Foster); stamens included.

Type in the Gray Herbarium, collected on perpendicular rocks of El Cañon de Naciento del Diablo, below El Espinal, Department of Nariño, Colombia, altitude 2,100 meters, November 29, 1946, by M. B. and R. Foster (No. 2266).

There is little doubt that *Tillandsia arcuans* is closely related to *T. lajensis* André. As both are represented by single collections, only further material can determine whether it is specifically distinct or merely a variety of *T. lajensis*.

Tillandsia brevior L. B. Smith, sp. nov. FIGURE 42

A *T. incurva* Grisebach, cui in habito valde similis, bracteis florigeris carinatis, quam sepalis valde brevioribus differt.

Stemless, 6 dm. long with the inflorescence extended; leaves many in a globose rosette, 45 cm. long, very densely appressed-lepidote throughout, sheaths large, distinct, oblong-elliptic, dark castaneous, blades narrowly triangular, long-acuminate, flat, 35 mm. wide, cinereous-lepidote; scape decurved, slender, very dark brown, glabrous; scape-bracts imbricate, elliptic, densely cinereous-lepidote, the lowest with foliaceous blades, the others apiculate; inflorescence subdigitate from a few spikes; primary bracts like the upper scape-bracts, erect, much shorter than the sterile bases of the spikes; spikes strict, linear with several imbricate sterile bracts at the base, broadly acute, the lateral 12–13 cm., the terminal 18 cm., long, strongly com-

planate, densely 12–16-flowered; rhachis flexuous, strongly angled, excavated next the flowers; floral bracts erect, 18 mm. long, much exceeded by the sepals, ovate, acute, carinate, even, glabrous at least in age; pedicels stout, obconic, 4 mm. long; sepals lanceolate, 20 mm. long, ecarinate, even, glabrous; petals, stamens, and style not known.

Type in the Gray Herbarium, collected in the vicinity of Santa Marta, Department of Magdalena, Colombia, in 1946, by M. B. and R. Foster. Number and exact locality data lost.

FIGURE 42.—*Tillandsia brevior: a*, Old scape and inflorescence, ×1/5; *b*, apex of spike, ×1; *c*, sepal, ×1. *Tillandsia chartacea: d*, Apex of scape and inflorescence, ×1/2; *e*, sepal, ×1.

Tillandsia chartacea L. B. Smith, sp. nov. **FIGURE 42**

A *T. incarnata* H. B. K., cui affinis, scapo validiore, foliis valde majoribus, inflorescentia ramosa differt.

Short-caulescent, flowering plant nearly 1 m. high; leaves 35 cm. long; sheaths elliptic, about 8 cm. long, covered with brown appressed scales; blades narrowly triangular, caudate-acuminate, 3 cm. wide, covered with appressed cinereous scales with brown centers, somewhat plicate; scape erect, elongate, 6 mm. thick, glabrous; scape-

bracts strict, densely imbricate and closely enfolding the scape, the lower foliaceous, the upper broadly elliptic, long-caudate, red; inflorescence few-branched, subdigitate; primary bracts like the upper scape-bracts but merely apiculate, very much shorter than the axillary spikes; spikes suberect, linear, strongly complanate, 11–13 cm. long, 15–20 mm. wide, densely 10–17-flowered; floral bracts elliptic, obtuse, ecarinate, 28 mm. long, exceeding the sepals, chartaceous, nerved, subdensely lepidote with cinereous brown-centered appressed scales; pedicels short and stout; sepals linear-lanceolate, 22 mm. long, more or less nerved, much connate posteriorly, lepidote; petals linear, obtuse, white with dark pink blade (! Foster); stamens included, the filaments plicate near the apex.

Type in the Gray Herbarium, collected on rocks at Suesca, Department of Cundinamarca, Colombia, altitude 2,580 meters, October 9, 1946, by M. B. and R. Foster (No. 1802).

Its plicate filaments indicate that *Tillandsia chartacea* is probably most closely related to *T. incarnata* H. B. K., and the leaves, spikes, and floral bracts are also similar although much larger. These two species would be widely separated in Mez's system since he makes a major division on the highly artificial character of the amount of branching of the inflorescence.

Tillandsia fusiformis L. B. Smith, sp. nov. FIGURE 43

A *T. sceptriforme* Mez et Sodiro, cui affinis, statura parva, laminis bractearum primarium strictis, sepalis acutis differt.

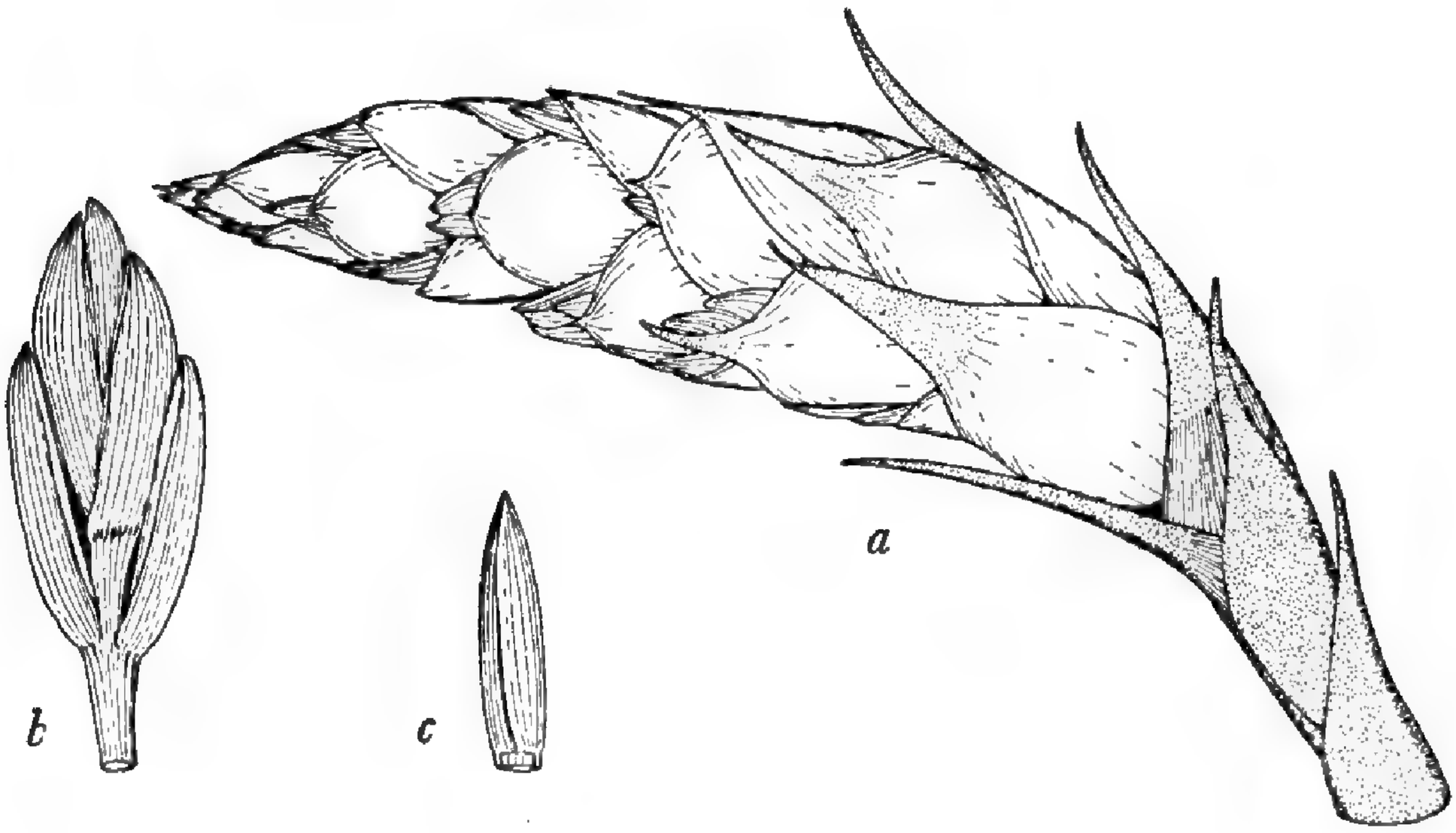

FIGURE 43.—*Tillandsia fusiformis: a*, Apex of scape and inflorescence, ×1/2; *b*, spike, ×1; *c*, sepals, ×1.

Stemless, 5 dm. high with the inflorescence extended; leaves 3–4 dm. long, covered with appressed cinereous brown-centered scales; sheaths elliptic, 1–2 dm. long, dark purple; blades ligulate, acute to

acuminate, 4 cm. wide; scape curved, largely concealed by the leaves; scape-bracts foliaceous, erect, densely imbricate; inflorescence densely bipinnate, fusiform, 15 cm. long, 3.5 cm. in diameter; primary bracts orbicular, obscurely punctulate-lepidote, lustrous, probably red in life, the lower ones exceeding to slightly shorter than the axillary spikes and bearing narrowly triangular densely lepidote blades; spikes short-stipitate without any sterile bracts, lanceolate, 3–4 cm. long, densely 5-flowered, strongly complanate; floral bracts imbricate, lance-oblong, acute, carinate, 20–24 mm. long, equaling the sepals, sub-chartaceous, strongly nerved, glabrous; pedicels very short and stout; sepals subfree, lanceolate, carinate, chartaceous, glabrous; petals 3 cm. long, the claw linear, white, the blade oblanceolate, obtuse, purple (! Foster); stamens included, the filaments joined in a tube (! Foster).

Type in the Gray Herbarium, collected on trees and rocks, at La Cabana near Pepino, Territory of Putumayo, Colombia, altitude 1,200 meters, November 21, 1946, by M. B. and R. Foster (No. 1970a=2341).

This species is founded on two plants from what is almost certainly the same collection, although one came numbered 1970 and the other 2341. A check of the field labels discloses that 1970 has already been applied correctly to another species, so the first plant of *Tillandsia fusiformis* becomes number 1970a. It is chosen as the type because its inflorescence is in good condition while that of plant number 2341 is very immature. The locality data necessarily come from 2341, as do the data on petals and stamens shown by a colored field sketch.

Tillandsia racinae L. B. Smith, sp. nov. FIGURE 44

T. fasciculata Swartz atque *T. dugesii* Baker in systema Mezii proxima sed vix affinis, spicis maxime elongatis, subteretibus, pluri-floris, bracteis florigeris sepalisque ecarinatis differt.

Stemless, flowering plant 9–12 dm. long with the inflorescence extended; leaves numerous in a crateriform rosette, over 1 m. long, covered with appressed scales; sheaths broadly elliptic, distinct, 2 dm. long, dark castaneous-lepidote; blades narrowly triangular, acuminate, 4 cm. wide, cinereous-lepidote; scape curved, very stout, glabrous; scape-bracts foliaceous, erect, densely imbricate; inflores-cence laxly bipinnate, glabrous; primary bracts broadly ovate, acute, shorter than the sterile bases of the axillary spikes; spikes arching-decurved, linear, subterete, 9 dm. long, 2 cm. wide at anthesis, dense, about 50-flowered with the apical flowers blooming after the basal ones have formed mature capsules (! Foster), bearing a few sterile bracts at the base; floral bracts broadly elliptic, obtuse, ecari-nate, 5 cm. long, coriaceous, even centrally, nerved by margins and apex, stramineous; sepals free, symmetrical, narrowly oblanceolate,

obtuse, 30 mm. long, ecarinate, coriaceous, nerved by margins and apex; petals 5 cm. long, lavender (! Foster); stamens exserted.

Type in the Gray Herbarium, collected on cliffs, Río Icononzo, Department of Tolima, Colombia, altitude 900 meters, October 13, 1946, by M. B. and R. Foster (No. 1885).

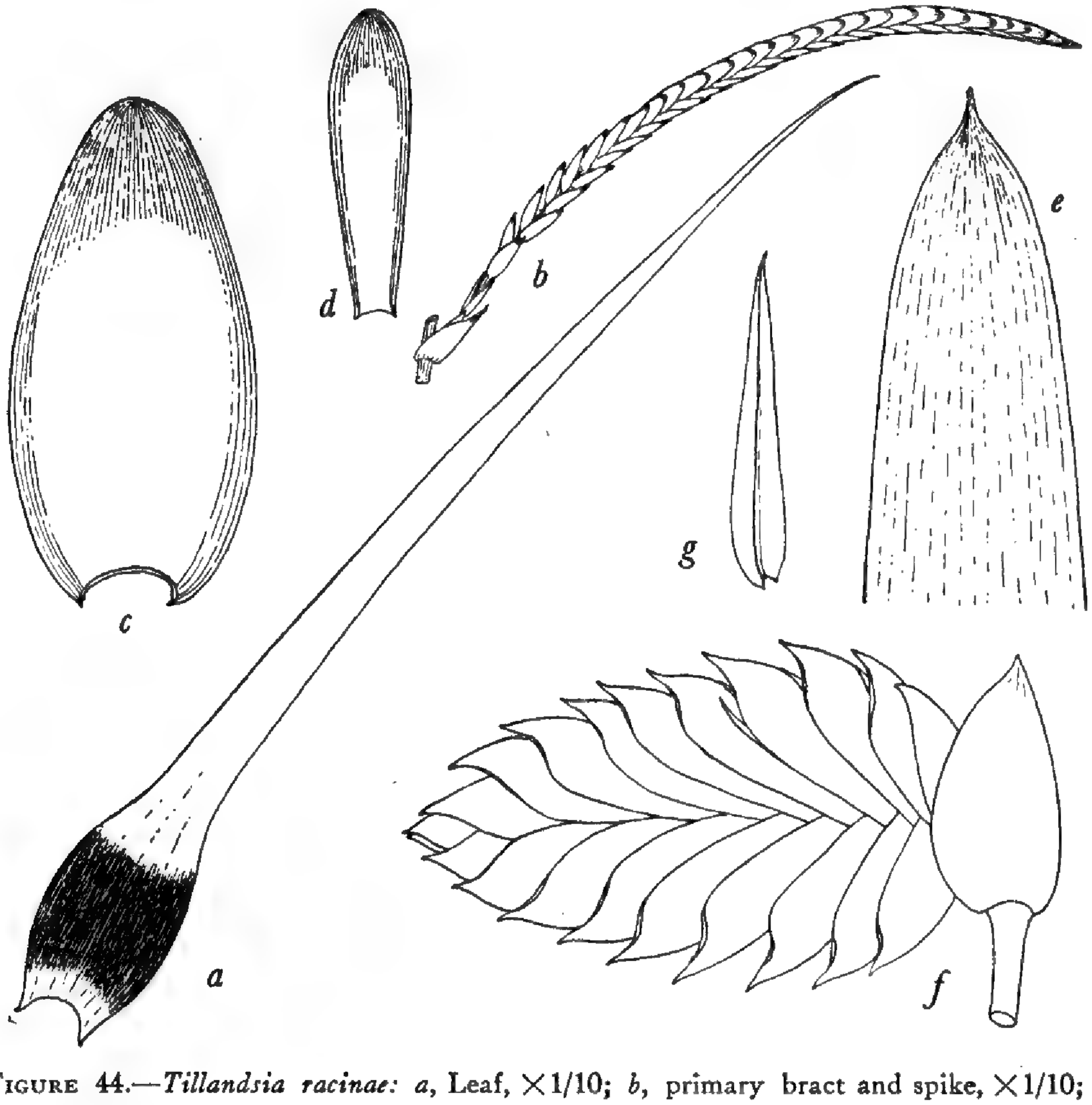

FIGURE 44.—*Tillandsia racinae: a*, Leaf, ×1/10; *b*, primary bract and spike, ×1/10; *c*, floral bract, ×1; *d*, sepal, ×1. *Tillandsia sigmoidea: e*, Apex of leaf, ×1/2; *f*, primary bract and spike, ×1/2; *g*, sepal, ×1.

Tillandsia sigmoidea L. B. Smith, sp. nov. FIGURE 44

A *T. brevilingua* Mez, cui aegre affinis, omnibus partibus multo majoribus, foliis acutis, scapi bracteis dense imbricatis, bracteis florigeris laevibus, margine prope apicem valde sigmoideo-curvatis, sepalis liberis differt.

Stemless, 1 m. tall; leaves 30–45 cm. long, obscurely brown-lepidote; sheaths elliptic, ample, nearly as long as the blades and scarcely distinct, brown or purple; blades ligulate, acute, 5–8 cm. wide, often purple-spotted; scape erect, stout; scape-bracts erect, densely imbricate, the upper ones broadly elliptic, acute; inflorescence subdensely bipinnate, globose, 25 cm. long, essentially glabrous, sublustrous;

primary bracts broadly ovate, acute, much shorter than the axillary spikes; spikes spreading, lance-ovate, acute, strongly complanate, 12 cm. long, 6 cm. wide, very densely 20–22-flowered; floral bracts broadly obovate with the margins sigmoid-curved just below the acuminate apex, 40–45 mm. long, exceeding the sepals, alate-carinate, coriaceous, even, red; pedicels broadly obconical, 2 mm. long; sepals lanceolate, acute, 30 mm. long, free, subcoriaceous, lepidote inside, the posterior ones carinate; petals purple (! Foster); capsule shorter than the floral bracts.

Type in the Gray Herbarium, collected in the last line of trees on the mountainside, Aduriameina, Sierra Nevada de Santa Marta, Department of Magdalena, Colombia, altitude, 3,060 meters, August 19, 1946, by M. B. and R. Foster and E. Smith (No. 1461). Duplicate in U. S. National Herbarium.

In the key in the Pflanzenreich, *Tillandsia sigmoidea* would fall next to *T. brevilingua* Mez of Peru, but the various differences, especially that of sepal-fusion, make it seem unlikely that there is any very close relationship between the two species.

Tillandsia suescana L. B. Smith, sp. nov. FIGURE 45

T. archeri L. B. Smith atque *T. turneri* Baker affinis, a priore partibus majoribus, spicis suberectis, densis, a posteriore bracteis primariis brevibus, sepalis majoribus, acutioribus, a ambobus inflorescentia pauciramosa, bracteis florigeris laevibus distinguenda.

Stemless, 4–6 dm. tall; leaves numerous in a crateriform rosette, 3–4 dm. long; sheaths elliptic, 15 cm. long, brown, punctulate-lepidote; blades narrowly triangular, acuminate, flat, 3–4 cm. wide, green and sparsely appressed-lepidote above, beneath covered with cinereous appressed scales; scape erect or ascending, much shorter than the leaves; scape-bracts erect, densely imbricate, the lower foliaceous, the upper elliptic with caudate cinereous-lepidote apices, faintly striate, subglabrous; inflorescence few-branched, digitate; primary bracts like the upper scape-bracts, only about half as long as the axillary spikes; spikes suberect, sessile, lanceolate, acute, strongly complanate, 7–9 cm. long, 22 mm. wide, densely 8–13-flowered; floral bracts elliptic, cucullate, equaling the sepals, carinate, coriaceous, even, nearly glabrous, orange-yellow (! Foster); pedicels obconical, 3 mm. long; sepals linear-lanceolate, acute, 28 mm. long, much connate posteriorly, coriaceous; petals linear, obtuse, about 5 mm. longer than the sepals, white with pink blade (! Foster); stamens included.

Type in the Gray Herbarium, collected on rocks and trees, Suesca, Department of Cundinamarca, Colombia, altitude 2,580 meters, October 9, 1946, by M. B. and R. Foster (No. 1801).

On account of its short primary bracts *Tillandsia suescana* would fall next to *T. archeri* L. B. Smith in Mez's system, but on most other counts it more nearly resembles *T. turneri* Baker.

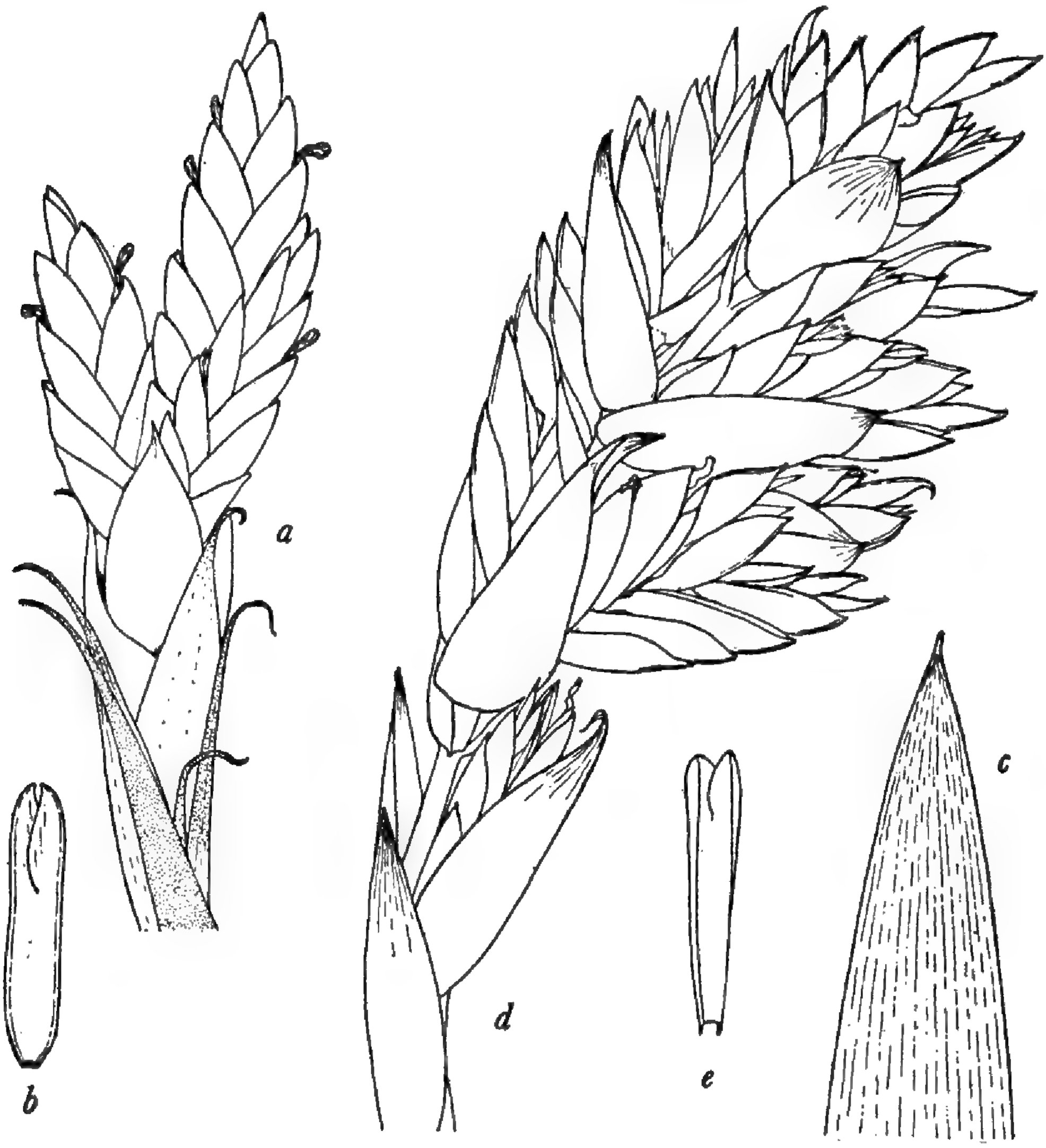

FIGURE 45.—*Tillandsia suescana: a*, Apex of scape and inflorescence, ×1/2; *b*, posterior sepals, ×1. *Tillandsia ultima: c*, Apex of leaf, ×1/2; *d*, apex of scape and inflorescence, ×1/2; *e*, posterior sepals, ×1.

Tillandsia ultima L. B. Smith, sp. nov. FIGURE 45

A *T. compacta* Grisebach, cui affinis, omnibus partibus majoribus, foliis valde acutioribus differt.

Plant about 8 dm. long with the inflorescence extended; leaves 4–5 dm. long, obscurely brown-lepidote; sheaths elliptic, ample, 15–18 cm. long, dark purple with light streaks at the base; blades ligulate, acute to acuminate, 4 cm. wide, maroon-spotted; scape curved, stout; scape-bracts erect, densely imbricate, the lower foliaceous, the upper elliptic, acuminate, red; inflorescence densely bipinnate, ellipsoid, 23 cm. long, 9 cm. in diameter, red, very sparsely and obscurely lepidote,

sublustrous; lower primary bracts like the upper scape-bracts, equaling or slightly exceeding the axillary spikes, the upper broadly rounded and apiculate, much shorter than the spikes; spikes strict, subsessile, lanceolate, acute, 8 cm. long, 3 cm. wide, strongly complanate, densely 4–7-flowered; floral bracts elliptic, acute, 35 mm. long, much exceeding the sepals, sharply carinate, coriaceous, even; pedicels 2 mm. long; sepals oblanceolate, obtuse, 25 mm. long, carinate, coriaceous, even, posteriorly connate for more than half their length; petals and stamens not known; capsule prismatic, slenderly stipitate, acuminate, barely exserted from the floral bracts.

Type in the Gray Herbarium, collected in the last line of trees on the mountainside above Aduriameina, Sierra Nevada de Santa Marta, Department of Magdalena, Colombia, altitude 3,000 meters, August 19, 1946, by M. B. and R. Foster and E. Smith (No. 1460). Duplicate in U. S. National Herbarium.

Because of its size, *Tillandsia ultima* would appear to be related to *T. brunonis* André according to the key in the Pflanzenreich, but in both habit and the form of its parts it is much more like *T. compacta* Grisebach of Venezuela and the West Indies. The specific name alludes to the plant's location in the last line of trees on the mountain.

Vriesia cylindrica L. B. Smith—cf. under Ecuador (p. 445).

Vriesia fragrans (André) L. B. Smith, comb. nov.

Tillandsia fragrans André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. **60:** 567. Dec. 16, 1888; Brom. Andr. 83, *pl. 29, fig. A*. 1889.

TYPE LOCALITY: Quebrada de Las Juntas, "Ecuador." Type collected by André (No. 4397).

DISTRIBUTION: Colombia.

COLOMBIA:

CUNDINAMARCA: Tocaima, Dec. 1932, *Pérez Arbelaez* 2593 (US). In trees, Páramo de San Miguel, alt. 3,300 m., Oct. 12, 1946, *M. B. & R. Foster* 1880 (GH, US).

EL VALLE: Quebrada de Las Juntas, alt. 2,500 m., 1876, *André* 4397 (K, type).

The only "Las Juntas" noted by André in the account of his travels in the journal "Le Tour du Monde," is in Colombia near the Río Dagua. The Foster specimen shows two scales on the petal and these are connate for about nine-tenths of their length.

Vriesia heterandra (André) L. B. Smith, comb. nov.

Tillandsia heterandra André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. **60:** 567. Dec. 16, 1888; Brom. Andr. 83, *pl. 27*. 1889.

TYPE LOCALITY: Puente de Quetame, Andes of Bogotá, Department of Cundinamarca, Colombia. Type collected by André (No. 1213).

DISTRIBUTION: Colombia, Bolivia.

COLOMBIA:

NORTE DE SANTANDER: In trees, Bellavista on pipeline, alt. 750 m., Sept. 15, 1946, *M. B. & R. Foster* 1695 (GH, US).

SANTANDER: Woods, vicinity of California, alt. 2,200 m., Jan. 11–27, 1927, *Killip & Smith* 17115 (GH).

CUNDINAMARCA: Puente de Quetame, Andes of Bogotá, alt. 1,975 m., Jan. 1876, *André* 1213 (K, type).

BOLIVIA:

LA PAZ: Larecaja: Hacienda Casana on the road to Tipuani, alt. 1,400 m., 1922, *Buchtien* 7184 (US).

Transfer of this species to *Vriesia* is made on the basis of André's description and illustration, none of the other cited material having sufficiently well preserved petals.

Vriesia pereziana (André) L. B. Smith, comb. nov.

Tillandsia pereziana André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. **60:** 567. Dec. 16, 1888; Brom. Andr. 80, *pl. 28.* 1889.

TYPE LOCALITY: Río Funza, near Tequendama Falls, Department of Cundinamarca, Colombia. Type collected by André (No. 1348).

DISTRIBUTION: Vicinity of the type locality.

COLOMBIA:

CUNDINAMARCA: On small trees hanging above the rocks of the Río Funza near Tequendama Falls, alt. 2,550 m., Feb. 1876, *André* 1348 (K, type). On rocks and small trees, Salto de Tequendama, alt. 2,100 m., Oct. 16, 1946, *M. B. & R. Foster* 1907 (GH, US).

Both André's illustration and the Foster material show two large conspicuous scales on the petal.

Vriesia tequendamae (André) L. B. Smith, comb. nov.

Tillandsia tequendamae André, Énum. Bromél. 8. Dec. 13, 1888; Rev. Hort. **60:** 568. Dec. 16, 1888; Brom. Andr. 103, *pl. 36.* 1889.

TYPE LOCALITY: Falls of Tequendama, Department of Cundinamarca, Colombia. Type collected by André (No. 1355).

DISTRIBUTION: Colombia.

COLOMBIA:

MAGDALENA: In high trees, above Pueblo Bello, Sierra Nevada de Santa Marta, alt. 1,200 m., Aug. 16, 1946, *M. B. & R. Foster & E. Smith* 1453 (GH)

NORTE DE SANTANDER: Epiphyte, woods along stream, Culagá Valley, near Tapatá (north of Toledo), alt. 1,500–2,100 m., Mar. 3–8, 1927, *Killip & Smith* 20177 (GH, US).

CUNDINAMARCA: On rocks near the Falls of Tequendama, alt. 2,500 m., Feb. 1876, *André* 1355 (K, type). San Cristóbal, July 1917, *Ariste-Joseph* A112 (US). Quebrada de Chico, Macizo de Bogotá, alt. 2,650–2,750 m., June 1, 1939, *Cuatrecasas* 5253 (Hb. Nac. Colomb.). In small trees, cold dry windy areas, El Chico above Bogotá, alt. 3,000 m., Oct. 11, 1946, *M. B. & R. Foster* 1840 (GH).

PUTUMAYO: On trees, San Francisco, alt. 2,100 m., Nov. 26, 1946, *M. B. & R. Foster* 2264 (GH).

ANTIOQUIA: Epiphyte, moist open woods, on the road to Boquerón de San Cristóbal, alt. ca. 2,500 m., June 2, 1948, *Barkley, Durán, & Correa* 100 (US).

CAUCA: Epiphyte, forest, "Canaan," Mount Purace, Cordillera Central, alt. 3,100–3,300 m., June 11–16, 1922, *Killip* 6698 (GH). In virgin forest, vicinity of El Tambo, Munchique, alt. 2,000 m., June 13, 1936, *Sneidern* 735 (S).

The Killip and Smith material shows the same conspicuous scales on the petals that André illustrated.

ECUADOR

Vriesia appendiculata (L. B. Smith) L. B. Smith, comb. nov.
Tillandsia appendiculata L. B. Smith, Lloydia **11:** 307, *fig. 6*. 1949.

TYPE LOCALITY: Around Tambo Cachiyacu, along Río Cachiyacu, Province of Loja, Ecuador. Type collected by Julian A. Steyermark (No. 54780).

DISTRIBUTION: Province of Loja, Ecuador.

ECUADOR:

LOJA: On tree, western slopes of Cordillera de Condor, and northwestern slopes of Nudo de Sabanillas, around Tambo Cachiyacu, along Río Cachiyacu, about 2 leagues southeast of Yangana, alt. 2,000–3,000 m., Oct. 19, 1943, *Steyermark* 54780 (GH, type; F). Cajanuma, alt. 2,400 m., May 7, 1946, *R. Espinosa* E–353 (GH).

Vriesia arpocalyx (André) L. B. Smith, comb. nov.
Tillandsia arpocalyx André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. **60:** 567. Dec. 16, 1888; Brom. Andr. 101, *pl. 38*. 1889.

TYPE LOCALITY: South of Riobamba, Province of Chimborazo, Ecuador. Type collected by André (No. 4474).

DISTRIBUTION: Ecuador.

ECUADOR:

TUNGURAHUA: Dry hills between Baños and Ambato, alt. 1,800 m., Sept. 26, 1923, *Hitchcock* 21906 (GH, US).

CHIMBORAZO: Mountains, south of Riobamba, alt. 2,500 m., July 1876, *André* 4474 (K, type).

This transfer is based on the fact that the Hitchcock material shows two large highly connate scales on the petal.

Vriesia cylindrica L. B. Smith, sp. nov. FIGURE 46

A *V. harmsiana* L. B. Smith (cf. sub speciebus peruvianis), cui affinis, spicis brevioribus, ultra bracteas primarias paulo exsertis, infimis exceptis bracteis florigeris haud vel vix carinatis, mox glabris differt.

Epiphytic, stemless, 4–8 dm. high; leaves numerous in a crateriform rosette, 4–6 dm. long, densely and finely appressed-lepidote; sheaths elliptic, 1 dm. long, brown; blades spreading, very narrowly triangular, acuminate, 4 cm. wide at the base; scape short and stout, largely concealed by the leaves; scape-bracts densely imbricate, the lower foliaceous, the upper broadly elliptic with a linear, usually reflexed blade; inflorescence slenderly cylindric, densely bipinnate; lower primary bracts like the upper scape-bracts, the upper merely apiculate, nearly equaling the spikes, obscurely lepidote; spikes strict, elliptic, 6–8 cm. long, 2–3 cm. wide, strongly complanate, dense, 8–12-flowered, bearing a few carinate lepidote sterile bracts at the base; rhachis excavated; floral bracts imbricate, ovate, acute, 24 mm. long, about equaling the sepals, coriaceous, even, all but the

lowest scarcely or not at all carinate and soon glabrous; pedicels 2 mm. long, stout; sepals free, lance-ovate, obtuse or apiculate but the thin margins inrolled and making them appear acuminate, 22 mm. long, coriaceous; petals about 3 cm. long, green with dark purple margins, bearing 2 scales (! Foster); stamens and pistil exserted.

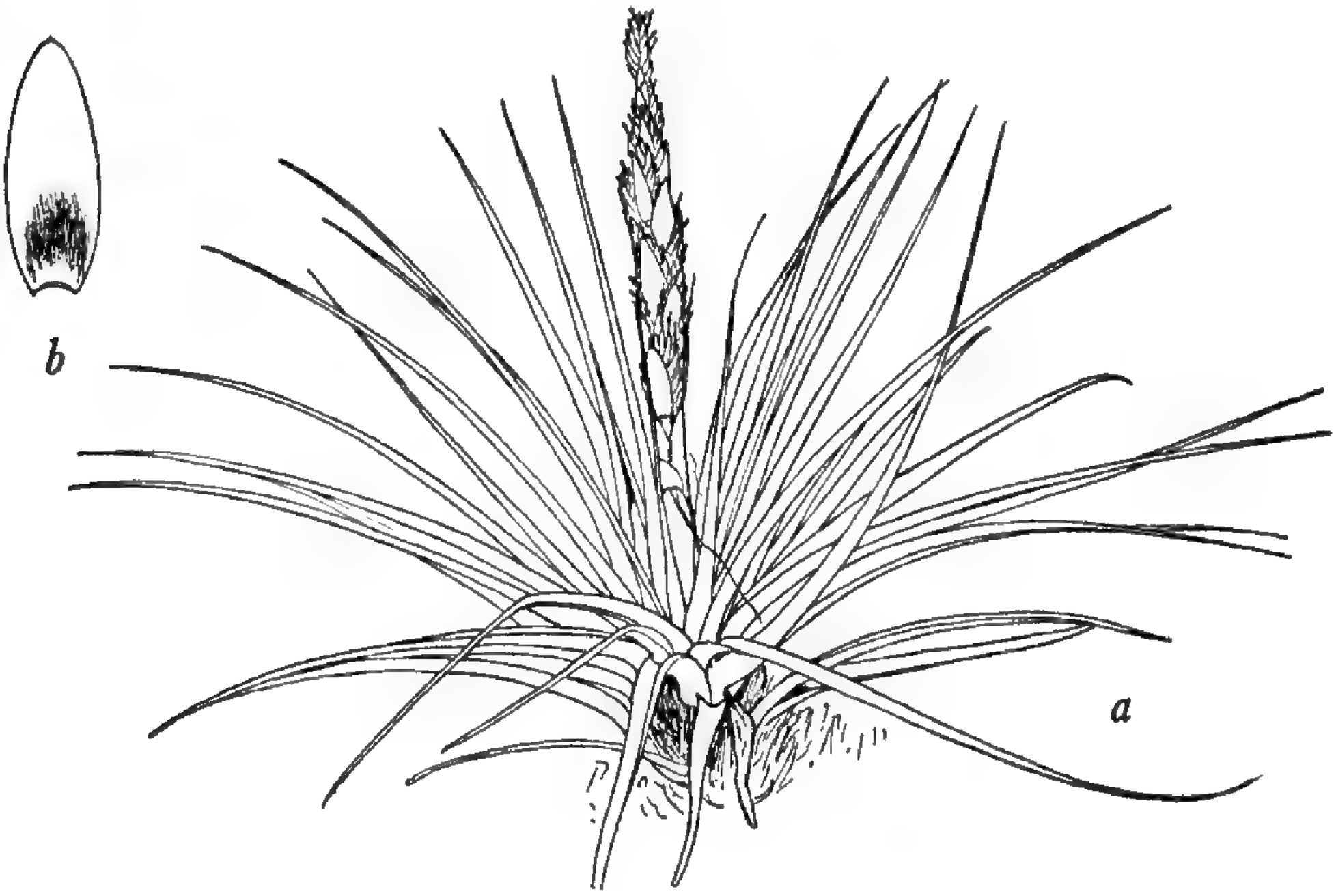

FIGURE 46.—*Vriesia cylindrica: a*, Habit, ×1/10; *b*, sepal, ×1.

Type in the U. S. National Herbarium, No. 1985919, collected at Santo Domingo, Province of Esmeraldas, Ecuador, altitude 600 meters, December 8, 1948, by M. B. Foster (No. 2643).

Additional specimens examined:

COLOMBIA:

NARIÑO: In trees, below Altaquer, Río Cuaciquiere, alt. 900 m., Nov. 12, 1946, *M. B. & R. Foster* 2143 (GH). Ricaurte, alt. 1,200 m., Nov. 15, 1946, *M. B. & R. Foster* 2185 (GH).

ECUADOR:

CHIMBORAZO: On tree, Huigra, alt. 1,200 m., July 4–27, 1923, *A. S. Hitchcock* 20739 (US).

Vriesia hitchcockiana (L. B. Smith) L. B. Smith, comb. nov.

Tillandsia hitchcockiana L. B. Smith, Contr. Gray Herb. **89**: 10, *pl. 4, figs. 2–5.* 1930.

TYPE LOCALITY: Between El Tambo and La Toma, Province of Loja, Ecuador. Type collected by A. S. Hitchcock (No. 21323).

DISTRIBUTION: Known only from the type.

ECUADOR:

LOJA: On tree, between El Tambo and La Toma, alt. 1,000–2,200 m., Sept. 3, 1923, *Hitchcock* 21323 (GH, type; US).

PERU

Vriesia harmsiana (L. B. Smith) L. B. Smith, comb. nov.

Tillandsia harmsiana L. B. Smith, Contr. Gray Herb. **98**: 16, *pl. 4, figs. 12–15.* 1932.

TYPE LOCALITY: Mito, Province of Huanuco, Peru. Type collected by J. Francis Macbride (No. 3272).

DISTRIBUTION: Known only from the type.

PERU:

HUÁNUCO: Steep rocky shrubby slopes, Mito, alt. ca. 3,000 m., April 8–18, 1923, *Macbride* 3272 (F, type; GH).

NORTHERN SOUTH AMERICA

Vriesia rubra (R. & P.) Beer, Brom. 98. 1857.

Tillandsia rubra R. & P. Fl. Per. **3**: 40, *pl. 266.* 1802.

Vriesia albiflora Ule, Verhandl. Bot. Ver. Brandenburg **48:** 141. 1907.

Tillandsia rhododactyla Mez, Repert. Sp. Nov. **16:** 76. 1919.

TYPE LOCALITY: Tarma, Department of Junín, Peru. Type collected by Ruiz and Pavon.

DISTRIBUTION: Trinidad, British Guiana, Colombia, western Amazon drainage.

TRINIDAD: Near Tamana, 1868, *Herb. Trin.* 2008 in part (TRIN); Tamana forest, 1915, *Broadway* 7806 (NY, TRIN).

BRITISH GUIANA:

NORTHWEST DISTRICT: Barima River, 1896, *Jenman* 7071 (JENMAN, type collection of *Tillandsia rhododactyla* Mez).

ESSEQUEBO: Epiphyte, Moraballi Creek, Essequebo River, Aug. 20, 1929, *Sandwith* 74 (K); Oct. 22, 1929, *Sandwith* 504 (K).

RUPUNUNI DISTRICT: Upper Rupununi River, near Dadanawa, latitude 2° 45′ N., 1922, *Cruz* 1709 (Bailey Hort., F, GH, NY, UC, US).

COLOMBIA:

NORTE DE SANTANDER: Dense jungle, Bellavista on pipeline, alt. 750 m., Sept. 15, 1946, *Foster* 1694 (GH).

PERU:

HUÁNUCO: Río Huallaga Canyon below Río Santo Domingo, alt. 1,300 m., 1923, *Macbride*, 4265 (F, GH).

JUNÍN: Tropical slopes, Tarma, *Ruiz & Pavon* (F, type collection).

BRAZIL:

ACRE TERRITORY: Epiphytic, by Rio Jurua Miry, June 1901, *Ule* 5615 (Museu Goeldi, Belem, Pará, type collection of *Vriesia albiflora* Ule, photo F).

Type material of *Tillandsia rubra* R. & P. in the herbarium of the Chicago Natural History Museum, as well as a photograph of the type itself in the herbarium at Madrid, show it to be identical with the later *Vriesia albiflora* Ule, and not with *Tillandsia deppeana* Steud., as was formerly supposed.

SYNOPSIS OF THE TRIBE TILLANDSIEAE.[3] PART 4

This is the fourth part of a synopsis of the Tillandsieae that distinguishes species without the aid of corolla or stamens. It comprises those species of *Tillandsia* and *Vriesia* with acaulescent habit, narrowly triangular to linear leaf-blades, simple inflorescence, distichous non-secund flowers, and symmetrical sepals. Some species exhibit all of these characters in occasional specimens, but more often lack one or more of them. For instance, several species that normally have leaves distributed along a stem, or have a compound inflorescence, at times produce plants with rosulate leaves or a simple inflorescence. Such species are noted inside parentheses in the present key to indicate that they are logically treated elsewhere, and a footnote is appended whenever they have been treated in a previous part of the synopsis. The criterion of a predominantly simple inflorescence has been strained somewhat in order to include as many as possible of the pseudobulb-bearing species of *Tillandsia* subgenus *Tillandsia* (*Platystachys*).

The pseudobulb species of *Tillandsia* show only slight differences in gross morphology, but very strong contrasts in habitat and range, indicating promising lines of research in ecology and physiology. Their independence from soil removes a complicating factor usually present in such studies, and simplifies deduction of their controls accordingly. Thus, it might be possible to find out why *Tillandsia bulbosa* favors low altitudes while the closely related *T. butzii* grows at 1,200 to 2,300 meters, or why *T. circinnata* is found throughout the Bahamas, while *T. pruinosa* and *T. bulbosa* are not yet recorded there in spite of apparently equal opportunity to make the jump from Cuba.

KEY TO THE SPECIES

1. Spikes with the flowers distichous or secund or else the inflorescence reduced to a single flower.
   2. Sepals asymmetric, free, oblong or broadest near the apex, not over 10 mm. long---------- **Tillandsia** subgenus **Pseudo-Catopsis** [4]
   2. Sepals symmetric, or if slightly asymmetric, ovate or lanceolate, broadest near the base.
      3. Inflorescence of a single spike or reduced to a single flower, either terminal or pseudoaxillary.
         4. Plant caulescent; leaves distributed along the stem, not rosulate; leaf-blades linear or triangular---------- **Tillandsia** in part [5]
         4. Plant acaulescent, or if the stem is evident then the leaves rosulate at its apex; leaf-blades often ligulate.

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[3] For the sake of uniformity in this series the tribal designation has been retained, although the group is now generally considered to be a subfamily, the Tillandsioideae.

[4] Contr. Gray Herb. **89**: 15. 1930.

[5] Proc. Amer. Acad. **70** (Contr. Gray Herb. **106**): 156. 1935.

5. Flowers becoming secund at anthesis_____**Vriesia** in part [6]
5. Flowers not becoming secund at anthesis.
  6. Leaf-blades filiform to narrowly triangular, not ligulate.
    7. Leaf-sheaths inflated and forming a pseudobulb, their apices closely enfolding the scape or the base of the inflorescence (specimens of *Tillandsia incurva* and *Vriesia chontalensis* sometimes simulate this condition because the rosette is subglobose but the apices of the sheaths are well separated from the scape).
8. Floral bracts shorter than the sepals_**1. Tillandsia subulifera**
8. Floral bracts equaling or exceeding the sepals.
  9. Floral bracts even or nerved only near the margin, glabrous or obscurely lepidote, coriaceous; leaves concolorous or purple-margined, appressed-lepidote.
(Tillandsia balbisiana)
  9. Floral bracts either strongly nerved or densely lepidote or both together, subcoriaceous to chartaceous.
    10. Scape-bracts vaginiform, the upper ones merely apiculate; leaf-blades straight or arched, appressed-lepidote; sepals ecarinate_____**2. Tillandsia paraënsis**
    10. Scape-bracts foliaceous or the scape lacking; leaf-blades usually coiled or contorted.
      11. Floral bracts densely cinereous-lepidote with coarse spreading or subspreading scales; scape very short or lacking_____**3. Tillandsia pruinosa**
      11. Floral bracts appressed-lepidote or glabrous; scape generally evident.
        12. Leaf-sheaths variegated_____**4. Tillandsia butzii**
        12. Leaf-sheaths green, concolorous or with only a narrow marginal band of red or purple.
          13. Leaf-sheaths orbicular, distinct, making a sharp angle with the blades.
            14. Scape about as long as the inflorescence; floral bracts 15 mm. long, densely appressed-lepidote.
5. Tillandsia bulbosa
            14. Scape about twice as long as the inflorescence; floral bracts 10 mm. long, lepidote only along the keel_____**(Tillandsia disticha)**
          13. Leaf-sheaths ovate or elliptic, merging into the blades.
            15. Floral bracts nearly or quite glabrous.
6. Tillandsia caput-medusae
            15. Floral bracts densely lepidote.
              16. Pseudobulb elongate, one-third to more than one-half the total length of the plant.
7. Tillandsia circinnata
              16. Pseudobulb relatively much smaller, only 2–5 cm. long_____**8. Tillandsia baileyi**
    7. Leaf-sheaths not forming a pseudobulb, their apices well separated from the scape or the base of the inflorescence.
      17. Inflorescence sessile, terminal, 1- (rarely 2-) flowered.
9. Tillandsia andreana

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[6] Lilloa **6** (Contr. Gray Herb. **137**): 388. 1941.

17. Inflorescence scapose, mostly more than 2-flowered.
    18. Flowers imbricate at and after anthesis; floral bracts usually imbricate as well.
        19. Floral bracts distinctly and consistently shorter than the sepals.
            20. Floral bracts densely imbricate and concealing the rhachis; posterior sepals connate for half their length_____**10. Tillandsia exserta**
            20. Floral bracts enfolding the barely imbricate flowers, not concealing any part of the rhachis; posterior sepals barely connate_____**11. Tillandsia aurea**
        19. Floral bracts equaling or exceeding the sepals.
            21. Leaf-blades linear-subulate to filiform.
                22. Floral bracts coriaceous or subcoriaceous.
                    23. Floral bracts glabrous, lustrous.
                    (Tillandsia floribunda)
                    23. Floral bracts lepidote.
                        24. Leaf-sheaths 15–20 mm. wide.
                        (Tillandsia simulata)
                        24. Leaf-sheaths narrower.
                        (Tillandsia tenuifolia)
                22. Floral bracts membranaceous.
                    25. Scales of the leaves linear, spreading; sepals lepidote, 12 mm. long__**12. Tillandsia ignesiae**
                    25. Scales of the leaves orbicular, closely appressed; sepals glabrous, 19–30 mm. long.
                        26. Floral bracts 25–35 mm. long; sepals to 30 mm. long_____**13. Tillandsia chaetophylla**
                        26. Floral bracts and sepals not over 20 mm. long.
                        14. Tillandsia linearis
            21. Leaf-blades definitely triangular, although often very narrowly so.
                27. Floral bracts carinate toward the apex.
                    28. Leaf-blades with brown cross-bands; inflorescence 3-flowered_____**38. Vriesia jimenezii**
                    28. Leaf-blades concolorous or longitudinally striped; inflorescence few- to many-flowered.
                        29. Inflorescence nearly terete; posterior sepals high-connate.
                            30. Floral bracts sparsely lepidote; posterior sepals completely connate.
                            15. Tillandsia rhomboidea
                            30. Floral bracts glabrous; posterior sepals only partially connate_____**(Tillandsia acostae)**
                        29. Inflorescence definitely complanate.
                            31. Floral bracts coriaceous or subcoriaceous.
                                32. Inflorescence linear-lanceolate, not more than 12 mm. wide; leaf-sheaths scarcely if at all darker than the blades.
                                (Tillandsia polystachia)
                                32. Inflorescence lance-elliptic to ovate or oblong, much wider or the leaf-sheaths much darker than the blades.

33. Sepals nearly or quite free.
  34. Floral bracts even; inflorescence broad.
    35. Inflorescence sublax, the floral bracts not concealing the rhachis.
      16. Tillandsia pretiosa
    35. Inflorescence very dense, the rhachis wholly concealed.
      36. Leaf-sheaths concolorous; scape elongate; floral bracts lepidote toward the apex.
        37. Floral bracts sharply carinate; leaf-sheaths bright purple.
          17. Tillandsia lampropoda
        37. Floral bracts obscurely carinate; leaf-sheaths brown.
          39. Vriesia barclayana
      36. Leaf-sheaths green with longitudinal red stripes; scape very short.
        38. Sepals in fruit not more than 4 mm. wide, the posterior ones sharply carinate.
          18. Tillandsia anceps
        38. Sepals in fruit 6 mm. wide, very obtusely carinate if at all.
          19. Tillandsia cyanea
  34. Floral bracts nerved; inflorescence narrow.
    39. Scape erect, elongate; flowers usually numerous in each inflorescence, maturing in succession.
      20. Tillandsia lindeni
    39. Scape ascending, short; flowers few in each inflorescence, maturing all together
      21. Tillandsia umbellata
33. Sepals posteriorly high-connate.
  40. Bracts subinvolucrate beneath the inflorescence; sepals alate; leaf-sheaths deep castaneous.
    (Tillandsia punctulata)
  40. Bracts not at all involucrate beneath the inflorescence; sepals scarcely more than carinate.
    41. Sides of the inflorescence more or less convex; floral bracts ample.
      (Tillandsia fasciculata)
    41. Sides of the inflorescence flat; floral bracts 9–18 mm. wide.
      (Tillandsia tricolor)

31. Floral bracts thin at least when dry.
42. Floral bracts blackened when dry, probably fleshy when living, uncinate-incurved.
22. Tillandsia kegeliana
42. Floral bracts not blackened when dry.
43. Leaf-sheaths castaneous; sepals lanceolate, acute___**40. Vriesia chontalensis**
43. Leaf-sheaths green like the blades; sepals oblong, obtuse.
(Tillandsia valenzuelana)
27. Floral bracts ecarinate.
44. Sepals densely and persistently lepidote, at least the posterior ones carinate.
45. Scape two or three times as long as the leaves.
(Tillandsia incarnata)[7]
45. Scape shorter than the leaves.
23. Tillandsia lepidosepala
44. Sepals glabrous or glabrescent or sparsely and obscurely lepidote.
46. Rhachis alate and forming pouches about the bases of the flowers.
47. Leaf-sheaths large, elliptic; inflorescence 30–35 mm. wide.
48. Floral bracts equaling or barely exceeding the sepals, obovate.
39. Vriesia barclayana
48. Floral bracts twice as long as the sepals, broadly elliptic___**24. Tillandsia petraea**
47. Leaf-sheaths small, scarcely distinct from the blades; inflorescence 8 mm. wide.
25. Tillandsia espinosae
46. Rhachis not more than angled.
49. Leaf-sheaths large and conspicuous, often contrasting with the blades.
50. Leaf-blades 4 cm. wide, shorter than the sheaths_____**(Tillandsia walteri)**
50. Leaf-blades much narrower, much longer than the sheaths.
51. Sepals even, 15–20 mm. long; floral bracts not over 35 mm. long.
26. Tillandsia incurva
51. Sepals prominently nerved, to 24 mm. long; floral bracts to 45 mm. long.
27. Tillandsia patula
49. Leaf-sheaths small, narrow and inconspicuous, nearly or quite concolorous with the blades.
52. Leaves strongly pruinose-lepidote, at least on the margins.

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[7] Proc. Amer. Acad. **70** (Contr. Gray Herb. **106**): 173. 1935.

53. Floral bracts up to 70 mm. long, glabrous or the lower ones sometimes sparsely lepidote, the margin broad, scarious, nerveless.....(**Tillandsia xiphioides**)[8]
53. Floral bracts not over 40 mm. long, more or less lepidote.
54. Floral bracts 25–40 mm. long.
55. Sepals free; floral bracts coriaceous. (**Tillandsia boliviensis**)
55. Sepals connate posteriorly; floral bracts membranaceous. **28. Tillandsia pueblensis**
54. Floral bracts not over 21 mm. long.
56. Floral bracts densely lepidote, not over 11 mm. long. (**Tillandsia didisticha**)
56. Floral bracts glabrous or subglabrous, to 21 mm. long. (**Tillandsia lorentziana**)
52. Leaves closely appressed-lepidote.
57. Leaf-blades thick and rigid, ridged or keeled.
58. Inflorescence lanceolate or oblanceolate, not over 45 mm. long; leaf-blades abruptly acute; floral bracts and sepals acuminate. (**Tillandsia argentina**)[9]
58. Inflorescence linear, elongate; leaf-blades very slenderly acuminate; floral bracts and sepals obtuse. (**Tillandsia vernicosa**)
57. Leaf-blades thin, even.
59. Floral bracts elliptic-oblong, obtuse or apiculate, about 2 cm. long; sepals oblong, obtuse. (**Tillandsia valenzuelana**)
59. Floral bracts and sepals ovate to lanceolate, acute or acuminate.
60. Sepals up to 26 mm. long, not closely enfolded by the floral bracts. **29. Tillandsia achyrostachys**
60. Sepals not over 12 mm. long, closely enfolded by the floral bracts. **30. Tillandsia triglochinoides**
18. Flowers not imbricate at anthesis, either too remote or too spreading.
61. Leaf-blades linear, 1–2 mm. wide; pedicels distinct, 2–5 mm. long.....**31. Tillandsia argentea**

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[8] Proc. Amer. Acad. **70** (Contr. Gray Herb. **106**): 169. 1935.
[9] Proc. Amer. Acad. **70** (Contr. Gray Herb. **106**): 172. 1935.

61. Leaf-blades narrowly triangular, 5–70 mm. wide at the base.
    62. Flowers erect, appressed to the rhachis, remote.
        63. Leaves covered with coarse usually spreading scales.
            64. Scape and rhachis densely pale-appressed-lepidote, very slender; floral bracts enfolding the flowers, densely lepidote.....**11. Tillandsia aurea**
            64. Scape and rhachis glabrous; floral bracts with straight margins or somewhat enfolding the rhachis, glabrous or sparsely lepidote.
                32. Tillandsia karwinskyana
        63. Leaves covered with very fine closely appressed scales.
            65. Floral bracts even or but faintly nerved near the margin; rhachis usually geniculate.
                (**Tillandsia dasyliriifolia**)
            65. Floral bracts prominently nerved throughout; rhachis merely flexuous in most cases.
                66. Sepals 14–18 mm. long; rhachis slender.
                (**Tillandsia utriculata**)
                66. Sepals 25–30 mm. long; rhachis stout.
                (**Tillandsia makoyana**)
    62. Flowers divergent to spreading and thus failing to be imbricate even when more than twice as long as the internodes.
        67. Floral bracts much exceeding the sepals, 45–55 mm. long.
            68. Sepals carinate; floral bracts even.
                16. Tillandsia pretiosa
            68. Sepals ecarinate; floral bracts striate.
                27. Tillandsia patula
        67. Floral bracts slightly if at all exceeding the sepals, not much over 20 mm. long at most.
            69. Sepals very broadly rounded, subtruncate; rhachis 7 mm. thick.....**37. Vriesia goniorachis**
            69. Sepals narrowly rounded to acute; rhachis more slender.
                70. Floral bracts exceeding the sepals; flowers only divergent.....**30. Tillandsia triglochinoides**
                70. Floral bracts equaling or shorter than the sepals; flowers mostly spreading.
                    71. Floral bracts about equaling the internodes; flowers spreading; pedicels to 7 mm. long.
                    (**Tillandsia flexuosa**)
                    71. Floral bracts longer than the internodes; pedicels short.
                        72. Flowers spreading at anthesis.
                            73. Rhachis excavated.
                            33. Tillandsia monadelpha

73. Rhachis merely angled.
74. Floral bracts only about twice as long as the slender internodes, barely carinate.
34. Tillandsia narthecioides
74. Floral bracts about four times as long as the stout internodes, sharply carinate____**35. Tillandsia scaligera**
72. Flowers divergent at anthesis; floral bracts ecarinate_____**36. Tillandsia cornuta**
6. Leaf-blades ligulate, rounded and apiculate to broadly acute, or if acuminate then only for the apical part.

(To be continued.)

1. Tillandsia (Tillandsia) **subulifera** Mez, Repert. Sp. Nov. Fedde **16**: 74. 1919.

FIGURE 47

Stemless, 15–19 cm. high; leaves few in a distinct but slenderly cylindric pseudobulb, erect, the inner ones up to 18 cm. long, the

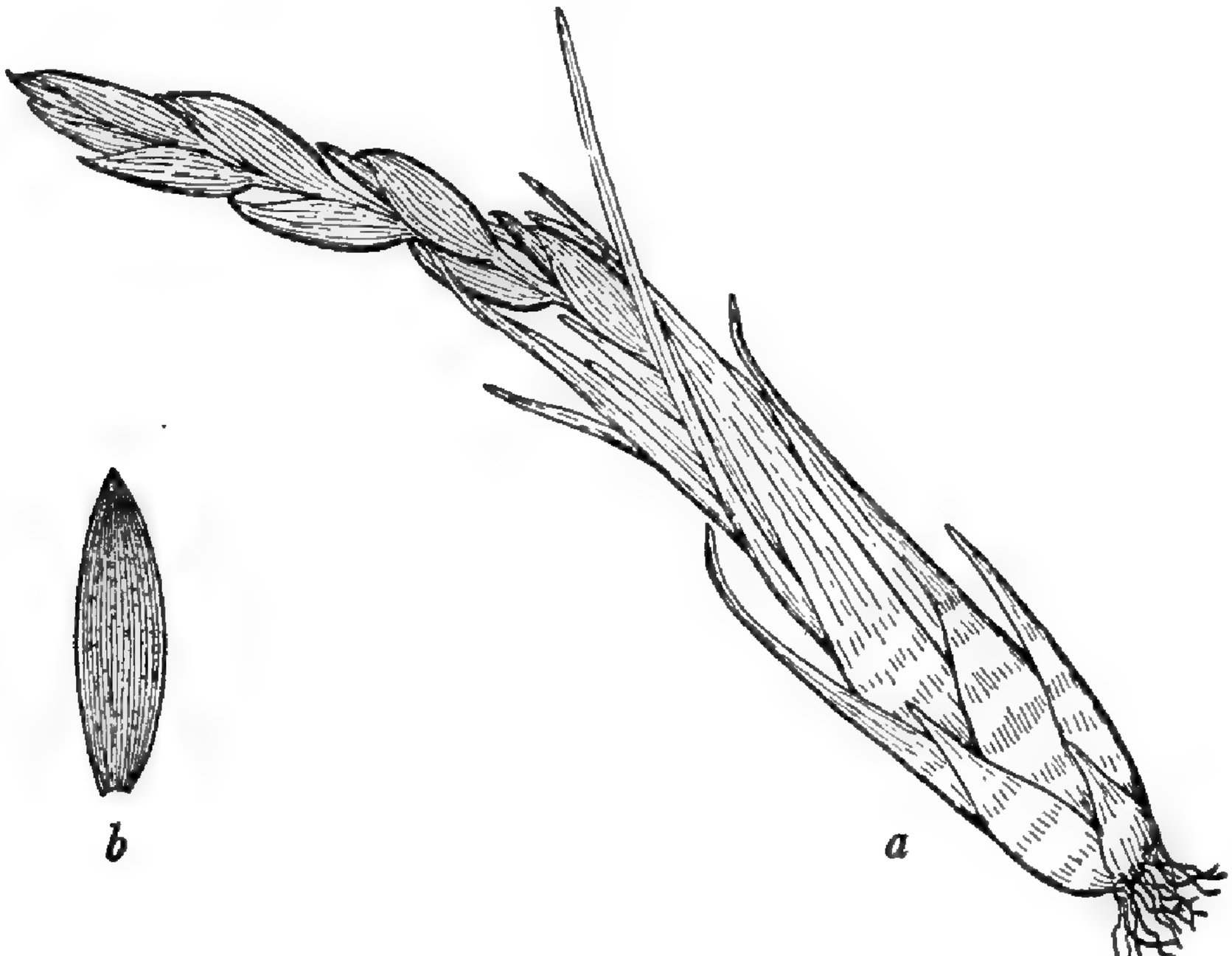

FIGURE 47.—*Tillandsia subulifera: a*, Habit, ×1/2; *b*, sepal, ×1.

outer greatly reduced, appressed-canescent-lepidote, concolorous or with faint white cross-bands; sheaths about half as long as the blades, ample; blades linear, abruptly acute or obtuse, 5 mm. wide at the base, complicate, strongly angled; scape erect, slender, exceeded and largely concealed by the leaves; scape-bracts subfoliaceous, erect, imbricate, many-nerved, densely lepidote; inflorescence erect, simple, oblong or linear, 5–7 cm. long, 4–6-flowered; axis slender, geniculate, mostly not covered by the floral bracts, appressed-lepidote; floral

bracts erect, elliptic, broadly acute, 2 cm. long, shorter than the sepals, incurved and more or less carinate toward the apex, prominently nerved, appressed-lepidote; flowers erect, short-pedicellate; sepals elliptic, narrowly obtuse, 22 mm. long, prominently nerved, appressed-lepidote, free; petals erect, 32 mm. long, yellow or white when dry; stamens exserted; capsule slenderly cylindric, acuminate, 6 cm. long.

ILLUSTRATIONS: Ann. Missouri Bot. Gard. **31**: *fig.* 119.

TYPE LOCALITY: By Longdenville, Trinidad, British West Indies. Type collected by Broadway (No. 4200).

DISTRIBUTION: Panama, Trinidad.

PANAMA:

CANAL ZONE: Las Cascadas Plantation, near Summit, Jan. 4, 1924, *Standley* 29664 (US). Barro Colorado Island, Aug. 1928, *Chickering* 62 (MICH); Aug. 26, 1934, *Shattuck* 1166 (F).

TRINIDAD: By Longdenville, *Broadway* 4200 (Berlin, type). On *Theobroma*, Tabaquite, Oct. 14, 1918, *Broadway* (US).

2. Tillandsia (Tillandsia) **paraënsis** Mez in Mart. Fl. Bras. **3**, pt. 3: 586, *pl. 109*. 1894. FIGURE 48

Tillandsia boliviensis Baker, Mem. Torrey Club **4**: 267. 1895, in part but not as to type.

Vriesia sanctae-crucis S. Moore, Trans. Linn. Soc. Bot. II. **4**: 491. 1895.

Tillandsia sanctae-crucis S. Moore ex Mez in DC. Monogr. Phan. **9**: 710. 1896.

Tillandsia juruana Ule, Verh. Bot. Ver. Brand. **48**: 143. 1907.

FIGURE 48.—*Tillandsia paraënsis: a*, Habit, ×1/4; *b*, sepal, ×1.

Plant stemless, 15–46 cm. high; leaves rosulate, to 35 cm. long, minutely pale-appressed-lepidote throughout, the outer ones reduced to small acute sheaths, the inner sheaths large, ovate, convex and forming an ovoid pseudobulb, blades very narrowly triangular, abruptly acute, pungent, straight or curved, involute; scape curved, suberect, 3 mm. in diameter, sparsely lepidote; scape-bracts elliptic,

equaling or slightly exceeding the internodes, densely lepidote, the lower long-laminate, the upper apiculate; inflorescence simple or of two spikes; primary bract like the upper scape-bracts, much shorter than the axillary spike; spikes linear, complanate, 6–17-flowered, up to 25 cm. long; floral bracts erect and imbricate but later convolute about the flowers and exposing the rhachis, broadly elliptic or suborbicular, obtuse or minutely apiculate, 25–32 mm. long, much exceeding the sepals, convex, ecarinate, nerved, subchartaceous, greenish, yellowish, or purplish, densely lepidote; pedicels very short; sepals free, elliptic, acute, 24 mm. long, ecarinate, lepidote; petals 33–70 mm. long, erect, red, shorter than the stamens; capsule cylindric, acute, 3–7 cm. long.

TYPE LOCALITY: Probably in the vicinity of Belém, which is also known as Pará, state of Pará, Brazil. Type collected by Siber (No. 68).

DISTRIBUTION: Colombia, Peru, Bolivia, western Brazil.

COLOMBIA:

VAUPÉS: Epiphytic, banks of the Río Cuduyarí, tributary of the Río Vaupés, alt. 200 m., Sept. 15, 1939, *Cuatrecasas* 6835 (Hb. Nac. Colomb.). Epiphytic, Bacuraba Cachoeira, the first major cataract on the Vaupés east of Mitu, alt. ca. 200 m., Nov. 4, 1944, *Allen* 3319 (US).

PERU:

LORETO: Caballo-Cocha on the Amazon River, Aug. 1929, *L. Williams* 2251 (F, GH). Epiphyte, dense forest, Mishuyacu, near Iquitos, alt. ca. 100 m., Sept. 24–28, 1929, *Killip & Smith* 29914 (US); Feb.–Mar. 1930, *Klug* 1020, 1059 (US); April 1930, *Klug* 1197 (F, NY, US).

BOLIVIA: *Bang* 159a in part (K, NY).

LA PAZ: Sur Yungas: Santa Ana, Bopi River, alt. ca. 400 m., Sept. 27, 1921, *O. E. White* 1087 (MICH, NY). Basin of Río Bopi, San Bartolome (near Calisaya), alt. 750–900 m., July 1–22, 1939, *Krukoff* 10045, 10229 (NY). Prov. Larecaja: Tuiri, near Mapiri on left bank of Río Mapiri, alt. 490–750 m., Sept. 12–30, 1939, *Krukoff* 10908 (F, GH, MO, NY).

SANTA CRUZ: Ichilo: On trees, Río Yapacani, alt. 350 m., Oct. 7, 1926, *Steinbach* 7596 bis (GH, NY).

BRAZIL:

AMAZONAS: Epiphyte, Juruá Miry, July 1901, *Ule* 5734 (Berlin, type of *Tillandsia juruana* Ule, Macbride photo No. 11508). Humayta, near Livramento, Oct.–Nov. 1934, *Krukoff* 6774 (NY).

ACRE TERRITORY: Near the mouth of the Rio Macauhan, a tributary of the Rio Yaco, latitude 9° 20′ S., longitude 69° W., Aug. 14, 1933, *Krukoff* 5499 (F, GH, MICH, MO, NY).

PARÁ: 1826, *Siber* 68 (BR, type).

MATO GROSSO: Epiphytic, near Santa Cruz, Sept. 1891, *S. Moore* 361 (BM, type of *Vriesia sanctae-crucis* S. Moore). Utiarity, July 1909, *Hoehne* 2032 (Mus. Nac. Rio). Rio Juruena, Jan. 1911, *Hoehne* 5162, 5163 (Mus. Nac. Rio). Buritizinho, below Mount Itapirapuan, April 17, 1894, *Lindman* A3379 (S).

Offhand, *Tillandsia juruana* would appear to differ from *T. paraënsis* in having imbricate floral bracts, but this is simply a difference

in age, the floral bracts becoming convolute about the flowers, and the two stages sometimes appearing on a single inflorescence.

3. Tillandsia (Tillandsia) **pruinosa** Swartz, Fl. Ind. Occ. **1:** 594. 1797.

FIGURE 49

Tillandsia breviscapa A. Rich. in Sagra, Hist. Cuba **11:** 265. 1850.
Platystachys pruinosa Beer, Bromel. 265, 1857.
Platystachys tortilis Beer, Bromel. 266. 1857.

Stemless, 8–20 cm. high; leaves in an elongate pseudobulb, up to 2 dm. long, densely cinereous- or ferruginous-lepidote with coarse

FIGURE 49.—*Tillandsia pruinosa: a*, Habit, ×1/2; *b*, posterior sepals and capsule, ×1.

spreading scales; sheaths elliptic to suborbicular, 2–4 cm. long, strongly inflated, abruptly contracted into the blade at the apex and the inner ones closely enfolding the base of the inflorescence, castaneous; blades usually exceeding the inflorescence, linear, involute-subulate, filiform-acuminate, recurved or contorted, 2–4 mm. in diameter; scape very short to none; inflorescence simple or rarely digitately compound from 2 or 3 spikes; spikes densely 5–15-flowered, up to 7 cm. long and 4 cm. wide but usually much smaller, acute, complanate; rhachis straight, angled, densely lepidote; floral bracts erect, four or five times as long as the internodes, ovate, acute, 20–26 mm. long, much exceeding the sepals, carinate toward the apex, subcoriaceous, pink at anthesis, densely lepidote with coarse spreading scales; flowers sessile; sepals broadly elliptic, obtuse, 13–19 mm. long, sparsely lepidote or glabrous, coriaceous, the posterior ones connate up to 6 mm.; petals linear, obtuse or acute, 3 cm. long, violet; stamens exserted; capsule cylindric, acute, up to 55 mm. long.

ILLUSTRATIONS: Belg. Hort. **26:** *pl. 16, 17.*

TYPE LOCALITY: Jamaica. Type collected by Swartz.

DISTRIBUTION: Florida, southern Mexico and Cuba to Ecuador and Brazil.

UNITED STATES:

FLORIDA: Collier County: Big Cypress, about 75–80 miles west of Miami, just north of the town of Everglades, Feb. 7, 1948, *R. Woodbury* (US).

MEXICO:

VERA CRUZ: Zacuapan, May 1919, *Purpus* 8229 (GH, MO, NY, US); 1929, *Skwarra* (GH). Mirador, May 24, 1929, *Skwarra* 18 (GH).

GUATEMALA:

PETÉN: Chicbul, La Libertad, April 8, 1933, *Lundell* 2626 (MICH). Monte Santa Teresa, April 14, 1933, *Lundell* 2900 (GH). Occupied clearing, La Libertad, April 20, 1933, *Lundell* 2911 (MICH).

BRITISH HONDURAS:

EL CAYO DISTRICT: Epiphyte in advanced forest, limestone valley, Valentin, June–July, 1936, *Lundell* 6272 (MICH).

HONDURAS:

CORTES: On tree, near shore of Lake Yojoa, alt. 630 m., July 29, 1934, *Yuncker* 4839 (F, MICH, MO).

COMAYAGUA: Vicinity of Siguatepeque, alt. 1,080–1,400 m., Feb. 14–27, 1928, *Standley* 56374 (F).

ATLÁNTIDA: On tree, Lancetilla Valley near Tela, alt. 20–600 m., Dec. 1927–Mar. 1928, *Standley* 54619, 56584 (F). Epiphyte, Lancetilla, Lancetilla Valley, June–July, 1929, *Chickering* 123a (MICH).

NICARAGUA:

JINOTEGA: In region of pine forest, southwest of Jinotega, along road to La Cantera and Los Pinos, alt. 1,050–1,350 m., June 25, 1947, *Standley* 10138 (F).

COSTA RICA:

GUANACASTE: On tree, El Arenal, alt. 485–600 m., Jan. 18, 19, 1926, *Standley & Valerio* 45325 (US).

LIMÓN: On tree in wet forest, Finca Montecristo on the Río Reventazón below Cairo, alt. ca. 25 m., Feb. 18, 19, 1926, *Standley & Valerio* 48998 (US).

CARTAGO: On tree, vicinity of Finca Las Cóncavas, alt. 1,200–1,300 m., Dec. 7, 8, 1925, *Standley* 41425 (US). On tree, vicinity of Pejivalle, alt. ca. 900 m., Feb. 7, 8, 1926, *Standley & Valerio* 47294 (US).

CUBA: Ex hb. Shuttleworth, 1849, *Rugel* with No. 246 (BM). *Sagra* (P, type of *Tillandsia breviscapa* A. Rich.).

ISLE OF PINES: On trees, coastal plain, San Juan, March 15, 17, 1916, *N. L. & E. G. Britton & Wilson* 15479 (F, NY).

PINAR DEL RÍO: On tree, hillside, trail from Buenaventura to San Juan de Guacamalla, Dec. 16, 1910, *Wilson* 9341 (NY). On tree, Sierra de Anafe, Dec. 18, 1911, *Wilson* 11403 (NY). On tree, Sierra de Cabra, Mar. 6, 1911, *N. L. & E. G. Britton & Cowell* 9820 (NY). On trees in savanna, San Gabriel to Santa Monica, Jan. 19, 1912, *Shafer* 11886 (NY). On live oak, Los Palacios to San Pablo de las Yeguas, Jan. 26, 1912, *Shafer* 11914 (NY). On bushes, Sierra Caliente, south of Sumidero, Aug. 15, 18, 1912, *Shafer* 13776 (NY).

LAS VILLAS (SANTA CLARA): On branches of trees in savannas, Cieneguita S., Dec. 7, 1895, *Combs* 671 (GH, MO). On trees, near Guanábana, Trinidad Mountains, alt. 260 m., Feb.–Mar., 1910, *N. L. Britton, Earle, & Wilson* 4768 (F, NY). On tree, Guajimica, Mar. 23, 1910, *N. L.*

Britton, Earle, & Wilson 5831 (NY). On shrub, palm barren, city of Santa Clara, Mar. 29–31, 1910, *N. L. & E. G. Britton, & Wilson* 6146 (NY). Banks of Yayabo River, near Pico Tuerto, Dec. 1911, *Clement* 2882 (NY). On tree trunks, Rincón to Banao, Mar. 3, 1912, *Shafer* 12322 (NY). Banao Mountains, Aug. 2, 1918, *León & Roca* 8077 (NY). On guazuma tree, San Blas, La Sierra, alt. 180–240 m., Mar. 1, 1928, *Jack* 6462 (GH); same, El Purial, Mar. 14, 1932, *Jack* 8561 (GH, NY). High on royal palm, Mina Carlota, southeast of Cumanayagua, Sierra de San Juan, alt. 300–400 m., Mar. 21–23, 1938, *Senn* 269 (US). Epiphytic along trail, 5 km. north of San Blas, June 1941, *Howard* 5369 (GH).

ORIENTE: On trees, "in Cuba Orientali," 1856–7, *Wright* 686 (BM, GH, MO, NY, US). Near river on tree, Holguin to Myabe, April 16, 1909, *Shafer* 1416 (NY). On trees, scarce, forest about Paso Estancia, April 27, 1909, *Shafer* 1593 (NY). On tree trunk by streamlet, the Pinales, southeast of Paso Estancia, May 1, 2, 1909, *Shafer* 1821 (NY). On tree overhanging big falls, Arroyo del Medio, Jan. 1910, *Shafer* 3328 (NY). On logwood tree, Monte Verde, alt. 660 m., Feb. 13, 1911, *Shafer* 8699 (NY). Near Santiago, May 1937, *Foster* III (GH).

SAN DOMINGO:

SANTIAGO: District of San José de las Matas: On trees, Jicomé, alt. 700 m., Dec. 18, 1929, *Valeur* 294 (F, MO, US); May 12, 1933, *Valeur* 991 (US). Abundant on trees, woods of *Pinus occidentalis*, vicinity of Rubio, alt. 560 m., April 17, 1946, *Jimenez* 1092 (US).

SAN JUAN: On lower surfaces of branches, hillslopes, vicinity of Río Arriba del Norte, north of San Juan, Sept. 9–14, 1946, *Howard* 8832 (GH).

MONTE CRISTI: Monción, alt. 550 m., Jan. 16, 1950, *Mera in hb. Jimenez* 1894 (US).

JAMAICA: *Swartz* (S, type).

SURREY: Near Gordon Town, alt. 255 m., Feb. 15, 1895, *Harris* 5527 (NY).

MIDDLESEX: On trees, Chapelton to Bull Head, Sept. 18, 1906, *Underwood* 3421 (NY).

CORNWALL: On trees, Troy, Cockpit Country, Sept. 13–18, 1906, *Britton* 506 (NY). Giddy Hall, St. Elizabeth, Feb. 16, 1926, *Maxwell* (BM).

VENEZUELA: *Fendler* 2448 (1 Mez).

COLOMBIA:

NORTE DE SANTANDER: Epiphytic, Río Catumbo, beyond Teorama, alt. 750 m., Sept. 11, 1946, *Foster* 1657 (GH).

ANTIOQUIA: Bello, Aug. 1944, *Emmanuel & Daniel* 3313 (GH, MO).

ECUADOR:

EL ORO: On tree, dry hill, Portovelo (gold mine near Zaruma), alt. 600–1,000 m., Aug.–Sept. 1923, *Hitchcock* 21259 (GH, NY, US).

BRAZIL; *Glaziou* 15462 (P).

ESPÍRITO SANTO: Jacu River, Victoria, alt. ca. 80 m., July 14, 1939, *Foster* 205 (GH).

RIO DE JANEIRO: Cantagallo, Aug. 24, 1884, *Glaziou* 16461 (P).

DISTRITO FEDERAL: Epiphyte, Restinga de Mauá, Rio de Janeiro, July 20, 1895, *Ule* 4052 (Mus. Nac. Rio).

4. Tillandsia (Tillandsia) **butzii** Mez in Engl. Pflanzenreich IV. **32:** 636. 1935. FIGURE 50

Tillandsia variegata Schlecht, Linnaea **18:** 429. 1844, not Vell. 1825.

Plant stemless, 2–3 dm. high; leaves few in a bulbous rosette, up to 5 dm. long, densely and finely pale-appressed-lepidote throughout,

the margins at first ciliate with coarse scales; sheaths suborbicular, inflated, forming a pseudobulb 25–45 mm. in diameter, dark brown or purple with numerous large pale green often confluent spots;

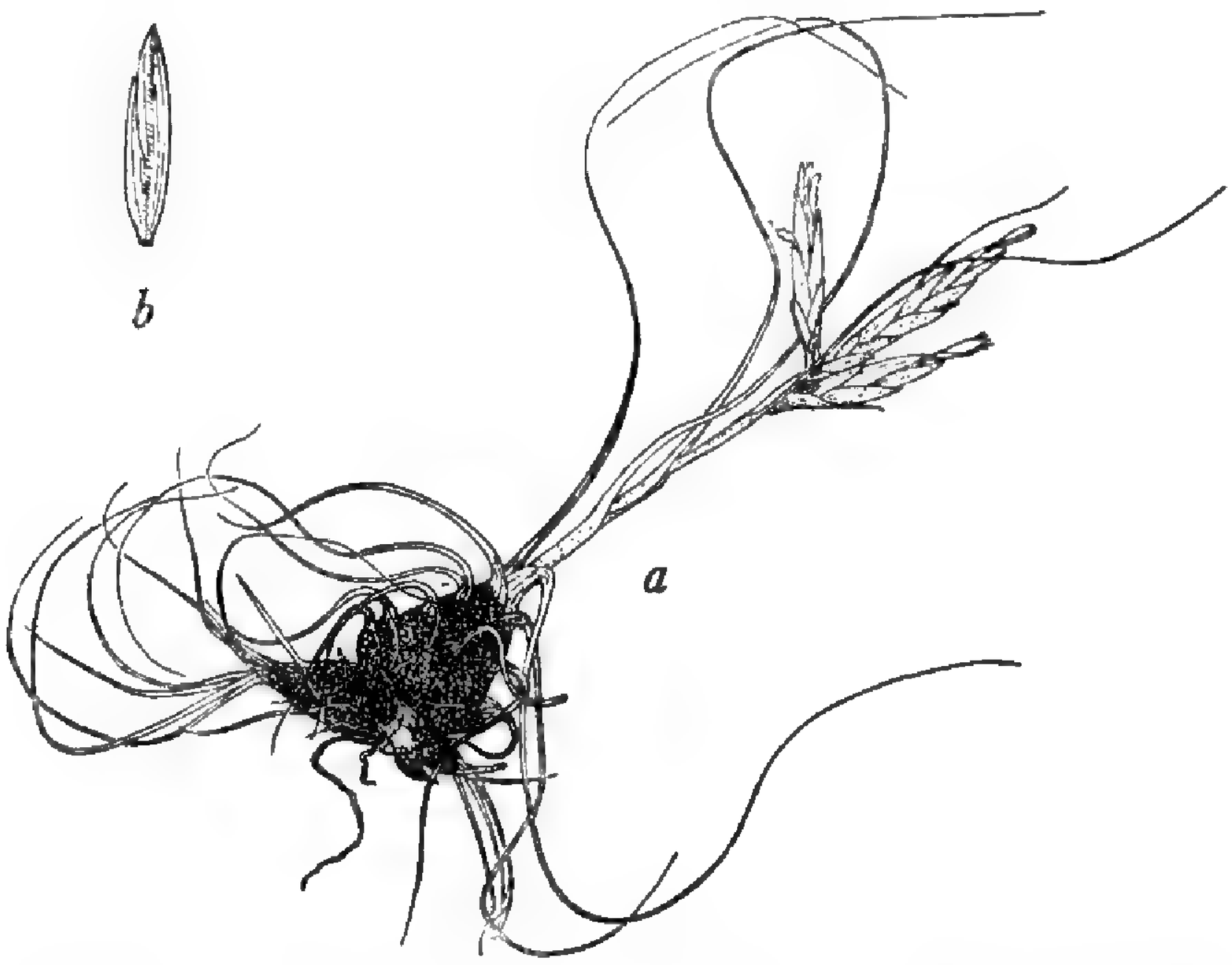

FIGURE 50.—*Tillandsia butzii: a*, Habit, ×1/4; *b*, posterior sepals, ×1.

blades involute-subulate, filiform-acuminate, 3 mm. in diameter, contorted; scape erect, slender; scape-bracts foliaceous, imbricate; inflorescence digitate from a few subequal spikes or rarely simple; primary bracts subfoliaceous, concolorous, the broadly ovate sheath much shorter than the axillary spike, the linear blade often much exceeding it; spikes erect to spreading, linear, acute, strongly complanate, 6–8 cm. long, about 1 cm. wide at anthesis, 5–8-flowered with 1 or 2 sterile bracts at the base; floral bracts erect, imbricate, ovate, acute, 20–28 mm. long, 10 mm. wide, much exceeding the sepals, three to four times as long as the internodes, subcoriaceous, densely pale-appressed-lepidote, prominently nerved and sometimes incurved or slightly carinate toward the apex; flowers subsessile; sepals narrowly elliptic, narrowly obtuse, 12–15 mm. long, coriaceous, glabrous, posteriorly connate for 4 mm.; petals erect, 30–35 mm. long, violet; stamens and pistil exserted; capsule slenderly cylindric, acute, short-beaked, 3 cm. long.

ILLUSTRATIONS: Garten-Zeit. Berlin **4:** *pl. 44.*

TYPE LOCALITY: Jalapa, Mexico. Type collected by Schiede.

DISTRIBUTION: Southern Mexico to Panama.

MEXICO: *Nuttall* (BM). Aug. 1853, *F. Müller* (NY). April 1931, *Purpus* 15765 (MICH).

VERA CRUZ: Orizaba, (ca. 1864), *Botteri* 1001 (GH). Valley of Córdoba, Mar. 17, (ca. 1865–6), *Bourgeau* 2192 (P). Jalapa, *Schiede* (Berlin, type); Aug. 1866, *Hahn* (P); Oct. 1888, *Com. Geogr. Explor. Rep. Mex.* (F, GH). On trees near Jalapa, alt. ca. 1,200 m., Mar.–May, 1899, *Pringle* 8189

(BM, F, GH, MO, NY, US). On trees, Zacuapan, Mar. 1913, *Purpus* 6343 (BM, F, GH, MO, NY, US). Mirador, May 10, 1929, *Skwarra* (GH). Near Banderilla, 1938, *Foster* II (GH).

MÉXICO: Valley of México, June 30, 1901, *Rose & Hay* 205 (US).

OAXACA: Cerro Gavilán, Cuyamecalco, District of Cuicatlán, alt. 1,800 m., April 17, 1919, *Conzatti & Gómez* 3491 (US). Epiphyte, near Ayutla, alt. ca. 1,650 m., Mar. 15, 1939, *Bevan* 399 (GH).

CHIAPAS: Canjob, Mar. 27, 1904, *Goldman* 801 (US). Mount Pasitar, Dec. 1936, *Matuda* 358 (MICH, MO, US). Mount Ovando, Feb. 1939, *Matuda* 2657 (NY).

GUATEMALA:

QUICHÉ: On tree between Quiché and San Pedro Jocopilas, alt. 1,800–2,100 m., Jan. 12, 1939, *Standley* 62463 (F).

HUEHUETENANGO: On tree, common, mountains northwest of Malacatancito, alt. 1,800–2,400 m., Jan. 14, 1939, *Standley* 62638 (F). On oak tree, along Aguacatán road east of Huehuetenango at Km. 13–14, alt. ca. 1,950 m., Jan. 2, 1941, *Standley* 82028 (F, GH).

ALTA VERAPAZ: Cobán, alt., 1,350 m., Mar. 1908, *Tuerckheim* II 2187 (US). On pine tree, Cobán, alt. 1,200 m., Sept. 1, 1920, *Johnson* 721 (US). On tree, wet forest near Tactic, above bridge across Río Frío, alt. ca. 1,400–1,500 m., Mar. 30, 1941, *Standley* 90467 (F, GH). On tree near Tactic, alt. ca. 1,500 m., April 10, 1941, *Standley* 92020 (F). On mossy hummock, large swamp east of Tactic, alt. ca. 1,450 m., April 14, 1941, *Standley* 92367 (F).

BAJA VERAPAZ: Santa Rosa, alt. ca. 1,500 m., April 1887, *Tuerckheim in J. D. Smith* 1172 (GH, US). On tree in forests of pine and oak, dry rocky hills north of Santa Rosa, Mar. 30, 1939, *Standley* 69752 (F). On tree in pine-oak forest, rocky hills near Santa Rosa, alt. ca. 1,500 m., April 4, 1941, *Standley* 91261 (F).

SAN MARCOS: Upper pine slopes bordering Río Malacate, barrancos 6 miles south and west of town of Tajumulco, northwest slopes of Volcán Tajumulco, alt. 2,300–2,800 m., Feb. 26, 1940, *Steyermark* 36686 (F).

QUEZALTENANGO: Epiphyte in cafetal, lower south slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, along great barranco between Finca Pirineos and San Juan Patzulín, alt. 1,300–1,500 m., Jan. 6, 1940, *Steyermark* 33669 (F). Epiphyte, Volcán Santa María, between Santa María de Jesús, Los Mojadas and summit of volcano, alt. 1,500–3,000 m., Jan. 12, 1940, *Steyermark* 33937 (F).

EL PROGRESO: Near Schwendener Finca above Morazán, alt. 1,290 m., Feb. 26, 1945, *Sharp* 45271 (U. Tenn.).

ZACAPA: Along Rillito del Volcán de Monos, Volcán de Monos, alt. 1,150–2,100 m., Jan. 10, 1942, *Steyermark* 42366 (F, GH).

CHIQUIMULA: Epiphyte, Cerro Tixixi, 3–5 miles north of Jocotán, alt. 500–1,500 m., Nov. 10, 1939, *Steyermark* 31654 (F).

JALAPA: On tree in barranco on south slopes 3/4 way up, Volcán Jumay, north of Jalapa, alt. 1,300–2,200 m., Dec. 1, 1939, *Steyermark* 32443 (F, GH).

SUCHITEPÉQUEZ: Volcán Santa Clara, between Finca El Naranjo and upper slopes, alt. 1,250–2,650 m., May 23, 1942, *Steyermark* 46614 (F, GH).

SANTA ROSA: Zamorora, alt. ca. 1,650 m., April 1893, *Heyde & Lux in J. D. Smith* 4628 (GH, US).

HONDURAS:

COMAYAGUA: Epiphyte, in ravine near El Achote, above the plains of Siguatepeque, alt. 1,350 m., July 19, 1936, *Yuncker, Dawson, & Youse* 5981 (GH, MO).

MORAZÁN: Uyuca, alt. 1,238 m., Aug. 1943, *Rodriguez* 590 (F). Slopes of Valle Encantado, Mount Uyuca, alt. 1,500 m., Dec. 8, 1946, *Williams & Molina* 11183 (GH). On tree, lower slopes of Cerro de Uyuca, alt. 1,530–1,600 m., Feb. 22, 1947, *Standley & Molina* 4340 (F).

EL PARAISO: Güinope, alt. 1,430 m., Dec. 1943, *Rodriguez* 1850 (F).

EL SALVADOR:

SAN VICENTE: On tree, Volcán de San Vicente, alt. 1,200–1,500 m., Mar. 7–8, 1922, *Standley* 21546 (GH, US).

COSTA RICA:

ALAJUELA: Canton Alfaro Ruiz, Zarcero, high limb of forest tree, alt. 1,700 m., Jan. 26, 1939, *A. Smith* NY–1563 (GH). Tapesco road to La Peña, region of Zarcero, *A. Smith* P–211 (F).

CARTAGO: Cartago, alt. ca. 1,250 m., Jan. 1887, *Cooper in J. D. Smith* 5955 (GH, US); April 1894, *J. D. Smith* 4965 (GH, US). Slopes of Irazu above San Rafael de Cartago, alt. 1,500 m., Dec. 1894, *H. Pittier* 9104 (US). Forests between Trejos and Las Vueltas, Tucurrique, alt. 900–1,000 m., April 1899, *Tonduz* 13061 (US). Vicinity of Cartago, alt. 1,500 m., April 19, 1906, *Maxon* 61 (US); alt. 1,425 m., Feb. 1924, *Standley* 33329 (US). Aguacaliente, Feb. 10, 1922, *Greenman* 5553 (GH, MO). Dulce Nombre, alt. ca. 1,400 m., Feb. 27, 1924, *Standley* 35796 (US). La Estrella, Mar. 26, 27, 1924, *Standley* 39502 (US). On tree, along Río Reventado, north of Cartago, alt. 1,460–1,650 m., Feb. 26, 1926, *Standley & Valerio* 49508, 49515 (US). On trees of potrero 1 mile east of Cartago, alt. ca. 1,400 m., Feb. 19, 1928, *Stork* 1008 (F, MICH). Between Santiago and Picacho Mondongo Jan. 23, 1933, *Brenes* 16975 (F). San Isidro, Cartago, alt. 1,400 m., Feb. 11, 1938, *Valerio* 1723 (F). Crown of tree, lower slope of Cerro de Carpintera, Aug. 22, 1940, *Chrysler* 5533 (F).

PANAMA:

CHIRIQUÍ: Pastures around El Boquete, alt. 1,000–1,300 m., Mar. 1911, *H. Pittier* 3011 (GH, US). Epiphytic on oak, trail from Paso Ancho to Monte Lirio, upper valley of Río Chiriquí Viejo, alt. 1,500–2,000 m., Jan. 16, 1939, *Allen* 1592 (MO).

The finely variegated bulbous leaf-sheaths of *Tillandsia butzii* are unique, making it one of the few species that can be identified positively from sterile material.

5. Tillandsia (Tillandsia) **bulbosa** Hook. Exot. Fl. **3**: *pl. 173*. 1826. FIGURE 51

Tillandsia bulbosa β. brasiliensis Schult. in Roem & Schult. Syst. Veg. **7**: 1212. 1830.

Tillandsia bulbosa var. *picta* Hook. Bot. Mag. Curtis **73**: *pl. 4288*. 1847.

Pourretia hanisiana Morr. ex Morr. Ann. Gand. **3**: 255. 1847, in synonymy.

Tillandsia inanis Lindl. & Paxt. Fl. Gard. **1**: 159. 1850.

Tillandsia erythraea Lindl. & Paxt. Fl. Gard. **1**: 160. 1850.

Tillandsia pumila Lindl. & Paxt. Fl. Gard. **1**: 160. 1850.

Platystachys inanis Beer, Bromel. 82. 1857.

Platystachys bulbosa Beer, Bromel. 83. 1857.

Platystachys erythraea Beer, Bromel. 83. 1857.

FIGURE 51.—*Tillandsia bulbosa: a*, Habit, ×1/3, after Hooker, Exot. Fl. *Tillandsia caput-medusae: b*, Habit, ×1/3; *c*, upper scape and compound inflorescence, ×1/3.

Plants stemless, usually densely aggregated, 7–32 cm. high; leaves 8–15, often exceeding the inflorescence, covered with fine closely appressed cinereous scales; sheaths orbicular, abruptly contracted into the blades, greatly inflated, 2–5 cm. long, forming a dense ovoid pseudobulb, green or greenish white, often with a narrow red or purple marginal band; blades involute-subulate, acuminate, contorted, spreading and at least the outer ones making a sharp angle with the apex of the sheath, up to 3 dm. long, 2–7 mm. in diameter; scape erect; scape-bracts foliaceous in form with elongate blades exceeding the inflorescence, the upper ones often red; inflorescence simple or subdigitate from a few spikes, red or green; primary bracts ovate, acute, much shorter than the axillary spikes but their foliaceous blades sometimes exceeding them; spikes spreading, lanceolate, acute, complanate, 2–6 cm. long, 2–8-flowered; rhachis slender, lepidote; floral bracts erect, imbricate, ovate, acute, 15 mm. long, exceeding the sepals, two to three times as long as the internodes, subchartaceous, densely and finely appressed-lepidote, carinate; flowers sessile; sepals oblong, apiculate, 13 mm. long, glabrous, more or less connate posteriorly; petals linear, acute, 3–4 cm. long, blue or violet; stamens and pistil exserted; capsule cylindric, up to 4 cm. long.

ILLUSTRATIONS: Ann. Gand **3**: *pl. 142:* Fl. Serres **3**: *pl. 221*; Bot. Mitteil. Trop· **2**: *pl. 4*; Bull. Sci. France & Belg. **47**: *pl. 7*.

TYPE LOCALITY: Trinidad. Type collected by the Baron de Schack, but evidently not preserved as a herbarium specimen.

DISTRIBUTION: Southern Mexico and the West Indies to Colombia and eastern Brazil.

MEXICO:

TABASCO: Epiphytic, Reforma, Balancán, May 1939, *Matuda* 3180 (F, GH).

CAMPECHE: On *Haematoxylum campechianum*, abundant in the southern part of the state, 1934, *Flores* 3 (F).

QUINTANA ROO: Lake Chichancanab, April 1917, *Gaumer* 23722 (F).

GUATEMALA:

PETÉN: Naranjo, Tikal District, alt. 100–500 m., Mar. 19, 1922, *Cook & Martin* 54 (US). La Libertad, April 1933, *Lundell* 2628 (MICH); 2932 (GH).

ALTA VERAPAZ: 1½–2 miles south of Cubilgüitz, alt. 300–350 m., Mar. 1, 1942, *Steyermark* 44434 (F). Vicinity of Laguna Sapalá (Chajvonuch), 1 mile southwest of Sibicté, alt. 280 m., Mar. 11, 1942, *Steyermark* 44935 (F). Epiphyte on lower half of slopes, Cerro Chinajá, between Finca Yalpemech and Chinajá, above source of Río San Diego, alt. 150–700 m., April 1–2, 1942, *Steyermark* 45584 (F).

IZABAL: Puerto Barrios, *Deam* 40 (MO). Jocoló, alt. 30 m., Jan. 1921, *Johnson* 1087, 1089, 1091, 1181 (US). On pine tree, vicinity of Quiriguá, alt. 75–225 m., May 15–31, 1922, *Standley* 24229 (GH, MO, NY, US). On tree near Entre Ríos, alt. ca. 18 m., April 30, 1939, *Standley* 72788 (F). Epiphyte, dry pine-clad slopes, between Milla 49.5 and ridge 6 miles from Izabal, Montaña del Mico, alt. 65–600 m., April 1, 1940, *Steyermark* 38543 (F). Common epiphyte on limbs of trees all along coast, Bay of Santo Tomás, between Escobas and Santo Tomás, alt. 0–2 m., April 13, 1940, *Steyermark* 39253 (F, GH). Epiphyte, upper slopes, along Río Frío and tributaries, alt. 75–150 m., Dec. 18, 1941, *Steyermark* 41535 (F). Common along Río Dulce below junction with Río Tameja, Dec. 28, 1941, *Steyermark* 42016 (F, GH).

BRITISH HONDURAS:

BELIZE DISTRICT: Pine ridge near Manatee Lagoon, Nov. 23, 1905, *Peck* 965 (GH). Epiphyte, pine ridge north of aviation field, Belize, Jan. 28, 1931, *Bartlett* 11202 (MICH). Big Fall, Belize River, Mar. 21, 1933, *Lundell* 3957 (GH). Maskall, April 9, 10, 1934, *Gentle* 1236 (GH, NY); 1314 (GH). One mile west of Maskall, New River, Aug. 30, 1936, *O'Neill* 8508 (GH).

ORANGE WALK DISTRICT: Honey Camp, Dec. 1928, *Lundell* 152 (F).

STANN CREEK DISTRICT: Generally on *Annona glabra* in swampy ground, Stann Creek Railway 11 mile, April 3, 1929, *Schipp* 114 (BM, F, GH, NY, US). On pine tree, Melinda Pine Ridge, Jan. 1937, *Gentle* 1936 (MICH). Epiphyte, Stann Creek Valley, Baboon Ridge, Jan. 20, 1940, *Gentle* 3145 (GH, MO, NY).

HONDURAS:

ATLÁNTIDA: On tree, Lancetilla Valley, near Tela, alt. 20–600 m., Dec. 1927–Mar. 1928, *Standley* 52694, 54343 (F, GH, US); 54610 (F, US). La Fragua, alt. 20 m., Feb. 7, 1928, *Standley* 55726 (GH, US). On tree, valley above Lancetilla, alt. 30 m., July 17, 1934, *Yuncker* 4627 (F).

NICARAGUA:

MANAGUA or CHONTALES: Camoapa to Granada, April 1938, *Garnier* 1836 (GH).

COSTA RICA:

GUANACASTE: On tree, vicinity of Tilarán, alt. 500–650 m., Jan. 10–31, 1926, *Standley & Valerio* 44269 (US). Los Ayotes, alt. 600–700 m., Jan. 21, 1926, *Standley & Valerio* 45619 (US).

PUNTARENAS: Coto, sea level, Feb. 17, 1933, *Valerio* 366 (F).

ALAJUELA: Epiphyte in clump, Caribbean rain forest, Villa Quesada, Canton San Carlos, alt. 950 m., April 15, 1939, *A. Smith* F–1946 (F).

LIMÓN: Mar. 1924, *Alfaro* 36623 (US). On tree, vicinity of Guápiles, alt. 300–500 m., Mar. 12, 13, 1924, *Standley* 37521 (US). On tree, Finca Montecristo, on the Río Reventazón below Cairo, alt. ca. 25 m., Feb. 18, 19, 1926, *Standley & Valerio* 48964, 49018 (US). Hamburg Finca, alt. ca. 55 m., Feb. 19, 1926, *Standley & Valerio* 48909, 48924 (US).

SAN JOSÉ: Forest along Río Paquita, alt. 1–3 m., Aug. 13, 1936, *Dodge & Goerger* 9765 (GH, MO).

PANAMA: Mar. 1905, *Cowell* 412 (NY, US).

BOCAS DEL TORO: Vicinity of Chiriquí Lagoon, May 17, 1940, *Wedel* 130 (MO); Oct. 23, 1940, *Wedel* 1330 (GH, MO, US); July 13, 1941, *Wedel* 2537 (GH, MO); Sept. 6, 1941, *Wedel* 2622 (MO). Epiphyte, Water Valley, Sept. 6, 1940, *Wedel* 646 (GH, MO). Epiphytic, vicinity of Santa Fé, forested slopes of Cerro Tute, alt. 750 m., Mar. 25, 1947, *Allen* 4398 (US).

COCLÉ: Vicinity of Penonomé, Feb.–Mar. 1908, *R. S. Williams* 609 (NY, US). Region north of El Valle, alt. 1,000 m., Sept. 18, 1946, *Allen* 3689 (MO).

CANAL ZONE: Las Cascadas Plantation, near Summit, Dec. 2, 1923, *Standley* 25754 (US); Jan. 4, 1924, 29665, 29690 (US). Balboa, Nov. 1923–Jan. 1924, *Standley* 28569 (US). Brazos Brook Reservoir, Sept. 1924, *Stevens* 717 (US). Barro Colorado Island, 1925, *Standley* 40878 (US); 1931, *Aviles* 27 (F); *Bailey* 371 (Bailey Hort.); *Shattuck* 154 (F); 521 (F). Near Madden Dam and along Azote Caballo Road near Alahuela, alt. 90–100 m., Nov. 27, 1934, *Dodge* 16581 (MO). Westerly arm of Quebrada Salamanca, alt. 70 m., Dec. 16, 1934, *Dodge, Steyermark, & Allen* 16581a (GH, MO).

CUBA:

ISLE OF PINES: On tree, vicinity of Siguanea, Feb.–Mar. 1916, *N. L. & E. G. Britton & Wilson* 14366 (NY, US).

PINAR DEL RÍO: On trees, edge of savanna, Hato del Medio and Retiro, *C. Wright* 3272 (GH, MO, US). On tree, vicinity of Buenaventura, Dec. 18, 20, 1910, *Wilson* 9387 (NY). Corrientes Bay, Mar. 10, 11, 1911, *Britton & Cowell* 9882 (NY). On live oak, Los Palacios to San Pablo de las Yeguas, Jan. 26, 1912, *Shafer* 11915 (NY). Dry rocks, La Guira, north of Sumidero, Aug. 17, 1912, *Shafer* 13755 (NY).

HABANA: Santa Catalina, Oct. 16, 1905, *Van Hermann* 3238 (POM); Jan.–Feb. 1907, *Caldwell & Baker* 7087 (F, POM).

MATANZAS: On low shrub, San Miguel de los Baños, Dec. 17, 18, 1931, *Killip* 13891 (US).

LAS VILLAS (SANTA CLARA): Sandy savanna near Monazo, Dec. 29, 1915, *León & Cazanas* 5961 (NY). On tree, Milpa, Cienfuegos Bay, Feb. 21, 1930, *Jack* 7671 (GH).

CAMAGÜEY: On *Tecoma*, vicinity of La Gloria, Feb. 6, 1909, *Shafer* 314 (F, NY, US). On trees, savannas near Camagüey, April 2–7, 1912, *N. L. & E. G. Britton & Cowell* 13268 (NY).

ORIENTE: On bushes, Holguín to Cacocum, April 6, 1909, *Shafer* 1843 (F, NY, US). Arroyo del Medio above the falls, Sierra de Nipe, alt. 450–550 m., Jan. 1910, *Shafer* 3329 (NY, US). Thickets 5 km. southwest of Woodfred, Sierra de Nipe, July 1941, *Howard* 6078, 6190 (GH). On shrubs in dry pasture, Río Yao, April 29, 1943, *Marie-Victorin* 60035 (GH).

SAN DOMINGO:

SAMANÁ: On trees, limestone crag, Cordillera Central, Los Haitises, Boca del Infierno, June 24, 1930, *Ekman* H–15411 (S).

JAMAICA:

SURREY: Hope River, alt. 450 m., Jan. 21, 1888, *Eggers* 3470 (GH). On tree, near Port Antonio, June 16, 1897, *Fredholm* 3016 (US).

MIDDLESEX: On stone wall, Grierfield near Moneague, April 3, 1908, *Britton* 2643 (NY). Vicinity of Mandeville, Feb. 15–26, 1910, *Brown* 175 (NY).

CORNWALL: On trees, Troy, Cockpit Country, Sept. 13–18, 1906, *Britton* 473 (NY).

PUERTO RICO: Mayaguez, 1913, *Hess* 588 (NY).

LESSER ANTILLES:

GUADELOUPE: On trees, Camp Jacob, Deshayes, 1893, *Duss* 3316 (NY, US). On *Cocos nucifera*, edge of forest, Sofaia, alt. 400 m., Dec. 12, 1936, *Stehlé* 1537 (US).

TOBAGO: *Broadway* 4287 (BM, F, NY). Near Frenchfield, Oct. 23, 1889, *Eggers* 5570 (GH).

TRINIDAD: 1877–80, *Fendler* 823 (BM). On small tree, Erin, Mar. 13, 1908, *Broadway* 2196 (F). Tamana, 1915, *Broadway* 7895 (TRIN). Moruga, Edward Trace, 1916, *Broadway* 8205 (TRIN). On *Theobroma*, Tabaquite, Oct. 14, 1918, *Broadway* (GH, NY). Quare River forests, Jan. 21, 1931, *Broadway* (GH).

SURINAME: Forest of the Agricultural Experiment Station, Paramaribo, April 11, 1916, *Samuels* (US).

BRITISH GUIANA:

NORTHWEST DISTRICT: Amakura River, latitude 8°10′ N., longitude 60° W., 1923, *Cruz* 3571 (NY, US).

POMEROON DISTRICT: Pasanalley Island, 1921, *Cruz* 1085 (NY).

DEMERARA: Demerara River, *Jenman* 6245 (Jenman, NY); April 1923, *Persaud* 186 (F). Malali, Demerara River, latitude ca. 5°35′ N., Oct.–Nov. 1922, *Cruz* 2741 (F, GH, NY, US).

ESSEQUEBO: Kaieteur Falls, 1872, *Appun* (BM). Tumatumari, Potaro River, 1921, *Gleason* 404 (NY). Vicinity of Bartica, Essequebo River, latitude 6°25′ N., 1922, *Cruz* 2027 (NY). Upper Mazaruni River, longitude ca. 60°10′ W., Sept.–Oct. 1922, *Cruz* 2033, 2181, 2297, 2398 (F, GH, MO, NY, US). Kamakusa, upper Mazaruni River, longitude ca. 59°50′ W., Nov. 23–29, 1922, *Cruz* 2806 (F, GH, MO, NY, US). From Sapodilla tree, river tidal flats, Mazaruni Forest Station, Potaro River Gorge, May 23, 1944, *Maguire & Fanshawe* 23580 (GH, NY, US).

VENEZUELA:

DELTA AMACURO TERRITORY: On trees, Caño Pedernales, July 18, 1917, *Curran & Haman* 1353 (GH).

ANZOÁTEGUI: Woods along Río Leon by Quebrada Danta, tributary to Río Neverí, northeast of Bergantín, alt. 500 m., Feb. 20, 1945, *Steyermark* 61041 (F, GH).

BOLÍVAR: Epiphyte, dense forest, Río Paragua, Salto de Auraima, alt. 275 m., April 10, 1943, *Killip* 37369 (GH, US). Salto Guaiquinima, Río Paragua, April 1943, *Cardona* 493 (US).

COLOMBIA:

NORTE DE SANTANDER: Río Catatumbo, beyond Teorama, alt. 750 m., Sept. 11, 1946, *Foster* 1654 (GH), 1655 (GH, US).

SANTANDER: Vicinity of Puerto Berrio, between Carare and Magdalena Rivers, alt. 100–700 m., Aug. 11, 1935, *Haught* 1879 (GH, US).

ANTIOQUIA: On trees, open woods, near Dabeiba and the right bank of the Río Sucio, alt. ca. 1,350 m., Dec. 20, 1947, *Gutiérrez & Barkley* 17C487 (US).

EL VALLE: Epiphytic, mangrove thicket along bay, Buenaventura, alt. 0–5 m., May 7, 9, 1922, *Killip* 5228 (GH, NY, US); April 13, 1939, *Killip* 34970 (GH, US). Punta Arenas, north shore of Buenaventura Bay, June 2, 1944, *Killip & Cuatrecasas* 38625 (GH, US).

NARIÑO: "Prov. de Barbacoas," May 1853, *Triana* 1306 (BM, Hb. Nac. Colomb.). Barbacoas, alt. 800 m., *Triana* 551 (US).

BRAZIL: *Blanchet* 1467 (BM).

PARÁ: Epiphyte, sandy coast, Ilha do Mosqueiro, near Pará (Belém), Nov. 3–9, 1929, *Killip & Smith* 30477 (NY, US), 30553 (GH, NY, US). On trees, Lagoa Agua Preta, Municipio de Belém, June 29, 1935, *Drouet* 1946 (F, GH). Epiphyte, south forest of Instituto Agronomico do Norte, Belém, Nov. 16, 1942, *Archer* 7828 (US).

PERNAMBUCO: Beach, Iguarassú, Oct. 7, 1887, *Ridley, Lea, & Ramage* (BM).

BAÍA: In trees, Agua Preta, alt. 240 m., June 3, 1939, *Foster* 72 (GH).

Much like *Tillandsia pruinosa*, *T. bulbosa* achieves a very wide distribution but at consistently low altitudes and usually near the coast. The striking and varied coloring of the leaves is almost entirely lost in dried specimens. However, the abrupt transition from leaf-sheath to blade and the close fine scales make the identity of the species fairly certain even in sterile specimens.

6. Tillandsia (Tillandsia) **caput-medusae** E. Morr. Belg. Hortic. **30:** 90. 1880.
FIGURE 51

Tillandsia langlassei Poisson & Menet, Bull. Mus. Hist. Nat. Paris **14:** 237. 1908.

Stemless, 15–25 cm. high or rarely up to 4 dm.; leaves often exceeding the inflorescence, covered with coarse pale slightly spreading scales; sheaths broadly ovate or elliptic, large, strongly inflated, forming an ovoid pseudobulb, merging gradually into the blades; blades linear-triangular, acuminate, involute-subulate, usually much contorted, up to 15 mm. wide; scape erect or ascending, slender; scape-bracts densely imbricate, foliaceous; inflorescence simple or digitately compound from 2–6 spikes; primary bracts broadly ovate, usually smaller than the floral bracts and with little or no blade, lepidote; spikes suberect to spreading, often curved, linear-lanceolate, acute, up to 18 cm. long, 6–12-flowered with several reduced sterile bracts at the base; rhachis nearly straight, slender, angled, glabrous; floral bracts suberect or divergent, imbricate, ovate-lanceolate, obtuse but the apex often inrolled so that it appears acute, ecarinate, up to 2 cm. long, equaling or slightly exceeding the sepals, barely more than twice as long as the internodes and exposing the rhachis, chartaceous, prominently nerved, nearly or quite glabrous, red, pink, and green; flowers

subsessile; sepals oblong, obtuse, subcoriaceous to chartaceous, prominently nerved, glabrous, the posterior ones somewhat connate; petals linear, erect, 3–4 cm. long, violet; stamens and pistil exserted; capsule slenderly cylindric, 3–4 cm. long.

TYPE LOCALITY: Mexico. Type described from live cultivated material and now represented by only an unpublished sketch in the Kew Herbarium.

DISTRIBUTION: Mexico to Costa Rica.

MEXICO: Xochicalco, April–May 1866, *Hahn* (P).

SONORA: Sierra de Alamos, near Alamos, Mar. 18, 1910, *Rose, Standley, & Russell* 13061 (US).

CHIHUAHUA: Barranca de Wa-pajeachi, May 1893, *Hartmann* 547 (GH). Western Chihuahua, Barranca Legion, Sierra Madre, *Hewitt* B (GH).

SINALOA: Foothills of the Sierra Madre, near Calomas, July 18, 1897, *Rose* 1799 (US). Vicinity of Rosario, April 14, 1910, *Rose, Standley, & Russell* 14503 (NY, US). San Juan, 1921, *Ortega* 4122 (US).

DURANGO: Epiphytic, Ojito, above Corral de Piedra on Río Piaxtla, alt. 1,500 m., April 12, 1943, *Lundell* 13010 (GH, Lundell).

NAYARIT: Hills west of Ahuacatlán ("Agua Catlan"), May 27, 1849, *Gregg* 995 in part (MO). On trees by Puga road 1 mile from Tepic, Nov. 5, 1925, *Ferris* 5789 (DS).

JALISCO: On *Ficus*, barranca near Guadalajara, June 25, 1892, *Pringle* 5334 in part (F, GH, MO, NY, POM).

VERA CRUZ: Zacuapan, 1929, *Skwarra* (GH, US).

MORELOS: Cuernavaca, alt. 1,500 m., April 9, 1923, *Reko* 4663 (US). Cuernavaca, June 25, 26, 1923, *Skwarra* s. n., 17 (GH). In valley, San Antonio, near Cuernavaca, alt. 1,600 m., Feb. 2, 1932, *Fröderström & Hultén* 1331 (S). On trees, Malpaís "El Tezcal," northeast of Cuernavaca, alt. 1,550 m., May 30, 1939, *Nagel* 8020 (GH).

MÉXICO: Epiphytic, Tejupilco, Temascaltepec District, alt. 1,340 m., May 25, 1932, *Hinton* 689 (GH, K). Pantoja, alt. ca. 1,500 m., Dec. 3, 1932, *Hinton* 2856 (K, NY). On a "Ciruelo," Pungaracho, April 6, 1933, *Hinton* 3750 (K).

FEDERAL DISTRICT: Mexico City, 1900, *Herrera in hb. Rose* 147 (US).

GUERRERO: Epiphytic, Providencia, alt. 900 m., April 29, 1899, *Langlassé* 1013 bis (K, type collection of *Tillandsia langlassei* Poison & Menet). Epiphytic, Taxco Viejo, April 28, 1936, *Abbott* 130 (GH). Epiphytic, cut-over hillside at Km. 338.3 beyond Acahuizotla on highway to Acapulco, alt. ca. 900 m., Aug. 20, 1948, *Moore & Wood* 4687 (US).

OAXACA: Pinotepa, May 1844, *Galeotti* 4919B (US). Chivela, April 16, 1910, *Orcutt* 3300 (F, GH, MO, US).

CHIAPAS: Monserrate, *Purpus* 10197 (US). Chicomucelo, alt. 800 m., July 14, 1941, *Matuda* 4509 (Lundell). Fraylesca, near Siltepec, alt. 2,000 m., Mar. 13, 1945, *Matuda* 5279 (GH). Tuixcum, near Mozintla, alt. 2,416 m., May 16, 1945, *Matuda* 5537 (GH). Epiphytic, dry rocky hills, vicinity of Ocozocuautla, April 10, 1947, *Moore* 2542 (US).

GUATEMALA:

ALTA VERAPAZ: On tree, along Río Polochic, near Pancajché, alt. ca. 900 m., April 10, 1941, *Standley* 91923 (F).

EL PROGRESO: Epiphytic, hills around Baranquillo, alt. 650 m., May 17, 1942, *Steyermark* 46438 (F, GH).

GUATEMALA: Lake Amatitlán, alt. 1,170 m., Mar. 1890, *J. D. Smith* 1951 (US). Between Amatitlán and Palín, Mar. 26, 1922, *Greenman* 5844

(GH, MO). On *Ficus*, Lake Amatitlán, alt. 1,200 m., April 17, 1937, *Muenscher* 12367 (F). On tree, vicinity of Lake Amatitlán, alt. 1,255 m., Mar. 15, 1941, *Standley* 89544 (F, GH).

RETALHULEU: On tree, along Río Samalá, on road between San Sebastián and Santa Cruz Muluá, alt. 330 m., Feb. 23, 1941, *Standley* 88149 (F, GH).

ESCUINTLA: Escuintla, alt. ca. 330 m., Mar. 1890, *J. D. Smith* 2010 (GH, NY, US). On tree, between Río Jute and Río Pantaleón on road between Escuintla and Santa Lucia Cotz, alt. 540–720 m., Jan. 24, 1939, *Standley* 63494 (F). On tree, along Río Guacalate, northwest of Escuintla, alt. ca. 700 m., Mar. 14, 1941, *Standley* 89327, 89399 (F). On tree, south of Río Burrión, northeast of Escuintla, alt. ca. 700 m., Mar. 16, 1941, *Standley* 89633 (F, GH).

SANTA ROSA: San Juan Utapa, alt. 1,350 m., June 1893, *Heyde & Lux in hb. J. D. Smith* 4643 (US).

JUTIAPA: On tree, between Jutiapa and La Calera, southeast of Jutiapa, alt. ca. 850 m., Nov. 2, 1940, *Standley* 76155 (F).

HONDURAS: On *Crescentia*, west coast, April 1931, *Bates* 2 (GH).

MORAZÁN: Río la Orilla, alt. 800 m., Aug. 1943, *Rodriguez* 239 (F). On tree, Quebrada de Santa Clara, near Río Yeguare, alt. ca. 800 m., Dec. 17, 1946, *Standley & Williams* 1603 (F).

ATLÁNTIDA: On tree, foothills back of Ceiba, July 23, 1938, *Yuncker, Koepper, & Wagner* 8609 (F, GH, MO, NY, US).

EL PARAISO: Region of Quebrada de Dantas, 5 km. south of Ojo de Agua, alt. ca. 750 m., Dec. 11, 1946, *Standley, Williams, & Molina* 1303a (F).

EL SALVADOR:

SANTA ANA: Volcán de Santa Ana, alt. 1,590–2,340 m., Feb. 19, 1946, *Carlson* 1069 (F).

SONSONATE: On tree, vicinity of San Antonio del Monte, alt. ca. 250 m., Mar. 23, 1922, *Standley* 22148 (GH, NY, US). On tree, vicinity of Izalco, Mar. 1922, *Standley* 22185 (GH, US).

SAN SALVADOR: Vicinity of San Salvador, *Renson* 321 (NY, US).

SAN VICENTE: Vicinity of San Vicente, alt. 350–500 m., Mar. 2–11, 1922, *Standley* 21158 (US).

NICARAGUA: *Garnier* 2007 (GH).

COSTA RICA:

GUANACASTE: Wooded hills of Nicoya, Dec. 1899, *Tonduz* 13648 (BM, US). On *Crescentia*, common, Las Cañas, alt. ca. 40 m., Feb. 2, 1926, *Standley & Valerio* 46672 (US).

ALAJUELA: On tree, El Coyolar, alt. ca. 240 m., April 1–3, 1924, *Standley* 39984, 40072 (US).

SAN JOSÉ: San José, alt. 1160 m., Oct. 1908, *Wercklé* 17471, 17475 (GH). On tree, Río Tirribí, near San José, Feb. 10, 1924, *Alfaro* 33972 (US).

7. Tillandsia (Tillandsia) **circinnata** Schlecht. Linnaea **18:** 430. 1844.

FIGURE 52

Tillandsia bulbosa sensu Chapm. Fl. South. U. S. 471. 1860. Not Hook. 1826.
Tillandsia paucifolia Baker, Gard. Chron. II. **10:** 748. 1878.
Tillandsia yucatana Baker, Journ. Bot. Brit. & For. **25:** 280. 1887.
Tillandsia pruinosa sensu Chapm. Fl. South. U. S. ed. 3, 498. 1897. Not Sw. 1797.
Tillandsia intermedia Mez, Bull. Herb. Boiss. II. **3**: 141. 1903.

FIGURE 52.—*Tillandsia circinnata: a*, Habit ,×1/2; *b*, flower, ×1; *c*, proliferating plant, ×1/4.

Stemless and 10–45 cm. high or pseudocaulescent by repeated proliferation of the inflorescence and several meters long; leaves thick, covered throughout with coarse closely appressed cinereous scales; sheaths large, broadly ovate, forming a narrowly ovoid or ellipsoid pseudobulb 5–15 cm. long, merging gradually into the blades, the

outer ones much reduced and bladeless; blades involute-subulate, pungent, up to 2 dm. long but often much shorter even on a large plant, 3–7 mm. in diameter, curved or contorted or coiled; scape erect; scape-bracts erect, imbricate, foliaceous with spreading or recurved-coiling blades; inflorescence simple or digitately or pinnately compound from a few spikes; primary bracts like the scape-bracts, always somewhat shorter than the axillary spikes but their blades often exceeding them; spikes erect or suberect, linear-lanceolate, acute, often curved, up to 12 cm. long but normally much smaller, 2–10-flowered; floral bracts erect, imbricate, elliptic, acute, nearly or quite ecarinate, 2–3 cm. long, exceeding the sepals, two to three times as long as the internodes, subchartaceous, nerved, densely pale-appressed-lepidote; flowers sessile; sepals lance-oblong, acute, about 2 cm. long, subchartaceous, glabrous or sparsely lepidote, nerved, the posterior ones more or less connate; petals linear, erect, to 4 cm. long, violet; stamens and pistil exserted; capsule slenderly cylindric, 4 cm. long.

TYPE LOCALITY: Near Hacienda de la Laguna, Vera Cruz, Mexico. Type collected by Schiede.

DISTRIBUTION: Southern Florida, Bahamas, Cuba, Hispaniola, Mexico, Central America, Colombia.

UNITED STATES:

FLORIDA: South Florida, *Chapman* (NY). On *Rhizophora*, southern border of the Everglades, Jan. (1882), *Curtiss* 2845 (BM, F, GH, MICH, MO, NY, US). Tamiami Trail, between Miami and Tampa, June 14, 1941, *Foster* 1158 (GH).

BROWARD COUNTY: On *Taxodium distichum*, west of Pompano, Jan. 19, 1930, *Moldenke* 486 (MO, NY). Epiphytic in hammock, 6 miles west of Davis, Jan. 30, 1940, *Seibert* 1173 (MO).

DADE COUNTY: Miami, May 1877, *Garber* (F, GH, US). On mangroves, Miami River, July 10, 1895, *Curtiss* 5466 (GH, MO, NY, US). Miami, Oct.–Nov. 1901, *Small & Nash* 39 (NY). Old Rhodes Key, Nov. 6, 7, 1901, *Small & Nash* (NY). Hammocks, Adams Key, Mar. 11, 1915, *Small & Mosier* 5740 (NY, US). Goodburn Hammock, Mar. 17, 1915, *Small & Mosier* 5933 (NY). Trees, Sykes Hammock, Sept. 1925, *Small* (GH).

MONROE COUNTY: Key West, *Blodgett* (NY), 1843, *Blodgett* (GH); 1841–46, *Rugel* 105 (BM, F, MO, NY, US). Sugar Loaf Key, Mar. 17, 1898, *Pollard, Collins, & Morris* 100 (BM, F, NY, US). Hammocks, lower portion of Key Largo, Jan. 10, 11, 1909, *Small & Carter* 3118 (NY). On tree in hammock, Big Pine Key, Mar. 1, 1936, *Killip* 31691 (GH). On *Bumelia angustifolia*, Big Pine Key, Feb. 4, 1940, *Seibert* 1264 (MO).

MEXICO: 1849, *Strickland* (BM).

SINALOA: Vicinity of Mazatlán, Mar. 31, 1910, *Rose, Standley, & Russell* 13791 (NY, US).

NAYARIT: Epiphyte hanging from trees, María Madre, Tres Marías Islands, May 17, 1925, *Mason* 1742 (DS, US); May 16, 1925, *Mason* 1719 (US); May 20, 1925, *Solis* 15 (US); same, Arroyo Honda, May 18, 1925, *Mason* 1765 (F, GH, NY, US). Vicinity of San Blas, Oct. 2, 1925, *Ferris* 5342 (DS).

VERA CRUZ: Hacienda de la Laguna, *Schiede* (Berlin, type). Carrizal, May 12–14, 1901, *Goldman* 716 (US). Acasonica, Aug. 1919, *Purpus* 8465 (US). Tamarindo, May 31, 1929, *Skwarra* 16 (GH).

COLIMA: Almost scandent by the coiled leaves, proliferously compound, abundant about Manzanillo, *Trelease* (MO). Pendent from bushes, east side of Manzanillo Bay, vicinity of Manzanillo, Dec. 1, 1925, *Ferris* 6205 (DS, US). Epiphyte on *Ficus*, near sea level near road one-half mile southeast of Manzanillo, Aug. 8, 1938, *Eyerdam & Beetle* 8701 (GH, US).

GUERRERO: Epiphytic, Zihuetenango, near sea level, Sept. 26, 1898, *Langlassé* 370 (F, GH, US, type collection of *Tillandsia intermedia* Mez; Geneva, type, Macbride photo No. 25263). Cliffs and steep bluffs with low scrub above river in Cañon del Zopilote, just north of Venta Vieja, Km. 263 on highway between Chilpancingo and Mexcala, alt. ca. 600 m., Aug. 23, 1948, *Moore & Wood* 4740 (US).

YUCATÁN: Mérida, Mar. 20, 1865, *Schott* 250 (BM, type of *Tillandsia yucatana* Baker); July 11, 1865, *Schott* 842 in part (F); July 1865, *Schott* 891 (F).

GUATEMALA:

ZACAPA: On tree, dry rocky slopes in vicinity of Río Hondo, alt. 250–350 m., Oct. 9, 1939, *Steyermark* 29374 (F). On tree, near La Fragua, alt. 200–500 m., Oct. 14, 1940, *Standley* 74796 (F).

CHIQUIMULA: On tree, between Ramírez and Cumbre de Chiquimula, on road between Chiquimula and Zacapa, alt. 400–600 m., Oct. 15, 1940, *Standley* 74488 (F).

HONDURAS:

COMAYAGUA: Ajuterique, alt. 750 m., Mar. 31, 1945, *Rodriguez* 3036 (GH).

COSTA RICA:

GUANACASTE: On trees, Port Parker, latitude ca. 10°57′ N., July 4, 1932, *Howell* (GH).

BAHAMAS: Clustered on trees, Fortune Island, Feb. 4, 1888, *Eggers* 3855 (BM). Purser Point, Andros Island, June 17, 1890, *Northrop* 654 (F, GH, NY). Cap Island, *Hitchcock* (F). Inagua Island, Dec. 4, 1890, *Hitchcock* (F, MO); Salt Pond Hill, Oct. 12, 1904, *Nash & Taylor* 939 (F, NY). Crooked Island, Dec. 25, 1890, *Hitchcock* (F, MO). On trees, coppice, south of Fox Hills, New Providence, Sept. 5, 1904, *Britton & Brace* 542 (F, NY). Great Bahama: on tree, coppice, Eight Mile Rocks, Feb. 5–13, 1905, *Britton & Millspaugh* 2567 (F, NY); Garden Cay, West End, April–May, 1905, *Brace* 3658 (F, NY). Andros, on shrubs, Deep Creek, Aug.–Sept. 1906, *Brace* 5172 (F, NY). Long Cay, hill above cove, Dec. 7–17, 1905, *Brace* 4215 (F, NY). Cat Island, on shrub, vicinity of the Bight, Mar. 1–6, 1907, *Britton & Millspaugh* 5834 (F, NY). Watlings Island, scrub lands, vicinity of Cockburn Town, Mar. 12, 13, 1907, *Britton & Millspaugh* 6072 (F, NY). Mariguana: Vicinity of Abraham Bay, Dec. 6–8, 1907, *Wilson* 7454 (F, NY); Southeast Point, Dec. 10–12, 1907, *Wilson* 7572 (F, GH, NY). Caicos Islands, South Caicos, Dec. 14–16, 1907, *Wilson* 7635 (F, NY).

CUBA:

PINAR DEL Río: Herradura, Sept. 18, 1905, *Van Hermann* 917 (POM). Jovero, San Julián, Jan. 1938, *Acuña* 10680 (Vegas).

CAMAGÜEY: Near southwestern end, Cayo Coco, Oct. 23, 1909, *Shafer* 2679 (F, GH, NY, US).

ORIENTE: 1939, *León* 1 (GH). On low trees, U. S. Naval Station, Guantánamo Bay, Mar. 17–30, 1909, *Britton* 2059 (NY). Maisí, July 8, 1938, *León* 152 (Carabia).

HAITI: Epiphytic, Île de la Gonave, Les Etruits, on road to Anse-à-Galets, edge of mud flats, Aug. 8, 1927, *Ekman* H–8851 (GH, NY, US).

NORD-OUEST: On shrub, arid mountain slope west of bay, vicinity of Port à l'Ecu, Mar. 17, 1929, *Leonard* 13871 (US).

SAN DOMINGO:

BARAHONA: Epiphyte, Valley of Neiba, alt. 50 m., Aug. 15, 1946, *Howard* 8341 (GH). Near La Salina, alt. ca. 1,000 m., Aug. 16–17, 1946, *Howard* 8367, 8383 (GH).

MONTE CRISTI: Epiphyte, elevated coral reefs near Río Yaque del Norte, south of Monte Cristi, Oct. 23, 24, 1946, *Howard* 9580 (GH).

COLOMBIA:

MAGDALENA: Epiphytic in *Pereskiopsis*, semiarid section, mountains above Santa Marta, alt. 300 m., July 29, 1946, *Foster & E. Smith* 1324 (GH).

INDEFINITE: Cultivated plant of unknown origin, Oct. 1878, *Hort. Kew* (K, type of *Tillandsia paucifolia* Baker).

A curious growth-form of this species occurs in western Mexico as evidenced by *Eyerdam & Beetle* 8701, *Ferris* 6205, *Mason* 1742, and *Trelease*. The inflorescence proliferates as a new rosette repeatedly, forming a chain of plants. Figure 52, *c*, shows the last two members of such a chain with the terminal plant producing a true inflorescence. The tightly curved base of the simple plant in figure 52, *a*, indicates that the plant grew pendent, apparently a frequent situation in this species.

8. Tillandsia (Tillandsia) **baileyi** Rose ex Small, Fl. Southeast. U. S. 246, 1328. 1903. FIGURE 53

Stemless, 2–4 dm. high, growing in dense masses; leaves several in a bulbous rosette, equaling or exceeding the inflorescence, densely appressed-cinerous-lepidote throughout; sheaths ovate, relatively small, forming an ovoid pseudobulb 2–5 cm. long, passing gradually into the blades, often conspicuously ciliate-lepidote; blades contorted, linear, involute-subulate, acuminate, 5 mm. in diameter at base; scape erect or ascending, 2 mm. in diameter, cinereous-lepidote; scape-bracts like the leaves but smaller and with narrow sheaths, which are often shorter than the upper internodes; inflorescence simple or rarely of 2 spikes; primary bract like the upper scape-bracts, much shorter than the axillary spike; spikes linear, 4–10 cm. long, 12 mm. wide, subdensely 6–17-flowered, complanate, appressed-cinereous-lepidote; floral bracts suberect, loosely imbricate, ovate, acute, 2 cm. long, exceeding the sepals, about three times as long as the internodes, ecarinate, subchartaceous, prominently nerved, roseate; flowers subsessile; sepals lanceolate, acute, up to 16 mm. long, chartaceous, prominently nerved, cinereous-lepidote, short-connate posteriorly; petals ligulate, 3 cm. long, purple; stamens and pistil exserted; capsule slenderly cylindric, 4 cm. long.

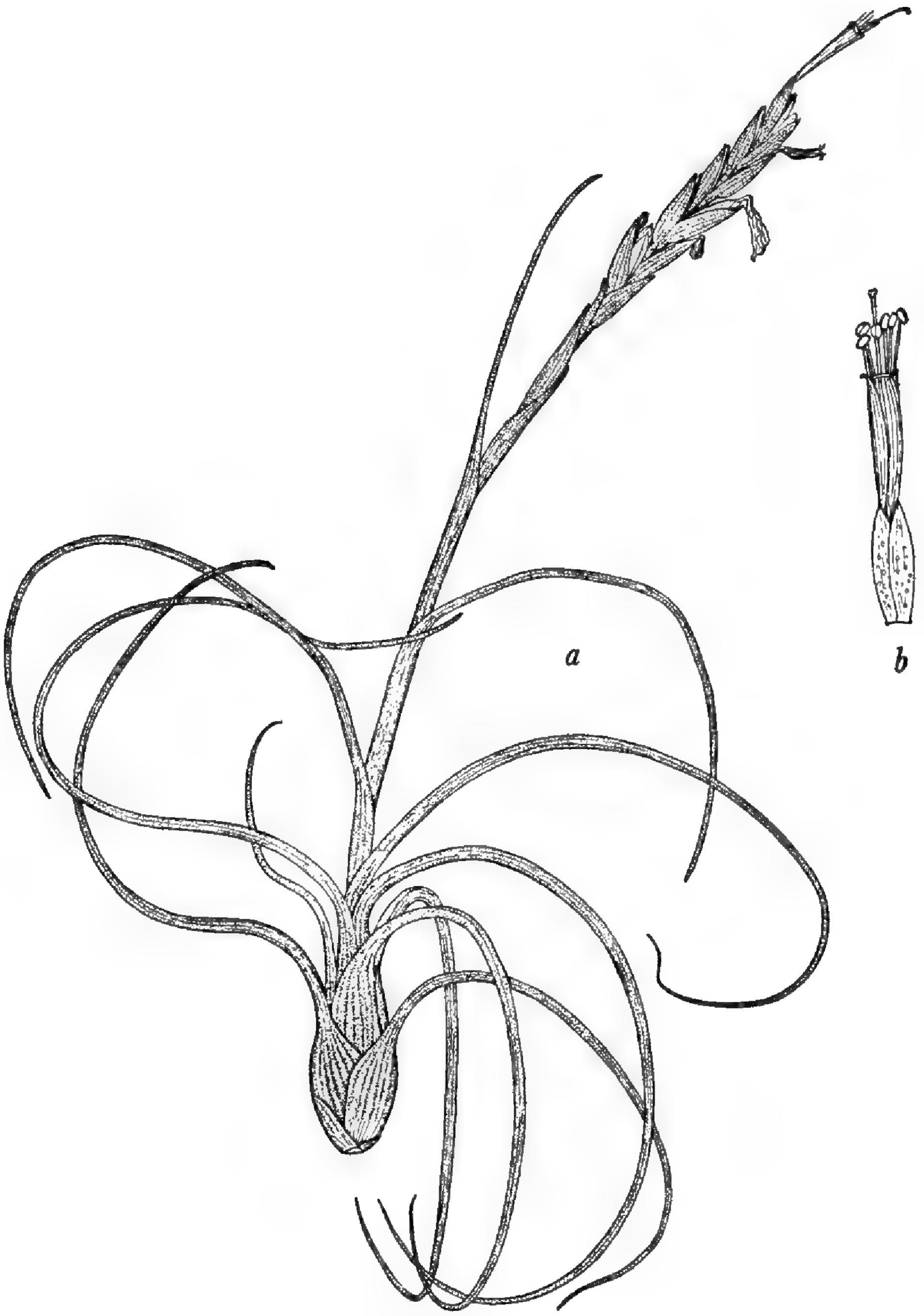

FIGURE 53.—*Tillandsia baileyi: a*, Habit, ×1/2; *b*, flower, ×1.

ILLUSTRATIONS: Lundell, Fl. Texas **3:** *fig. 23.*

TYPE LOCALITY: Cameron County, Tex. Type collected by V. Bailey (No. 226).

DISTRIBUTION: Southern Texas, Mexico, Guatemala.

UNITED STATES:

TEXAS:

KENEDY COUNTY: 1940, *Tharp* (GH, MO). Sarita, alt. 12 m., Aug. 7, 1941, *Fisher* 41172 (F). Live oak woods, Norias Division, King Ranch, Nov. 3, 1949, *Swallen* 10605 (US).

BROOKS COUNTY: 2¾ miles south of Barroso, 1935, *Cory* 14139 (GH).

CAMERON COUNTY: San Ignacio Ranch, May 8, 1900, *V. Bailey* 226 (US, type). Brownsville, April 8, 1921, *Camp* (GH, US); Mar. 14, 15, 1923, *Tharp* 1896 (US). Olmito, Oct. 23, 1927, *Rose & Russell* 24197 (GH, US). Near Brownsville, Nov. 1927, *Runyon* (US). Port Isabel, Mar. 27, 1932, *Jones* 29079 (F, MO, POM). On mesquite tree in thicket, 7½ miles west of La Paloma, May 5, 1940, *Lundell* 8706 (GH, MICH).

HIDALGO COUNTY: Cultivated and flowered in May, 1901, *V. Bailey* 5206 (US). Mercedes, Mar. 25, 1907, *York* 187 (DS). Two miles southwest of La Joya, Nov. 11, 1940, *Reed* 36063 (GH).

MEXICO:

TAMAULIPAS: Camargo, May 30, 1904, *Griffiths* 6494 (US). Fifty miles south of Matamoros, Dec. 1938, *LeSueur* 66 (F, GH).

VERA CRUZ (?): Huajesaron, April 23, 1929, *Skwarra* (GH).

GUATEMALA:

GUATEMALA: On tree, dry rocky thicket, near Fiscal, alt. 1,080–1,140 m., Dec. 12, 1938, *Standley* 59571 (F). On tree, on dry rocky brushy hillsides, near Fiscal, alt. ca. 1,100 m., Dec. 18, 1940, *Standley* 80349 (F, GH).

JUTIAPA: On tree, hills between Jutiapa and Plan de Urrutia, north of Jutiapa, alt. 900–1,200 m., Oct. 28, 1940, *Standley* 75487 (F, GH).

The type number of *Tillandsia baileyi* was erroneously cited as 26 instead of 226 in the original description.

9. Tillandsia (Tillandsia) **andreana** E. Morr. ex André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. **60:** 567. Dec. 16, 1888. FIGURE 54

Pityrophyllum andreanum E. Morr. ex André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. **60**: 567. Dec. 16, 1888, nomen in synonymy.

Tillandsia funckiana Baker, Handb. Bromel. 196. 1889.

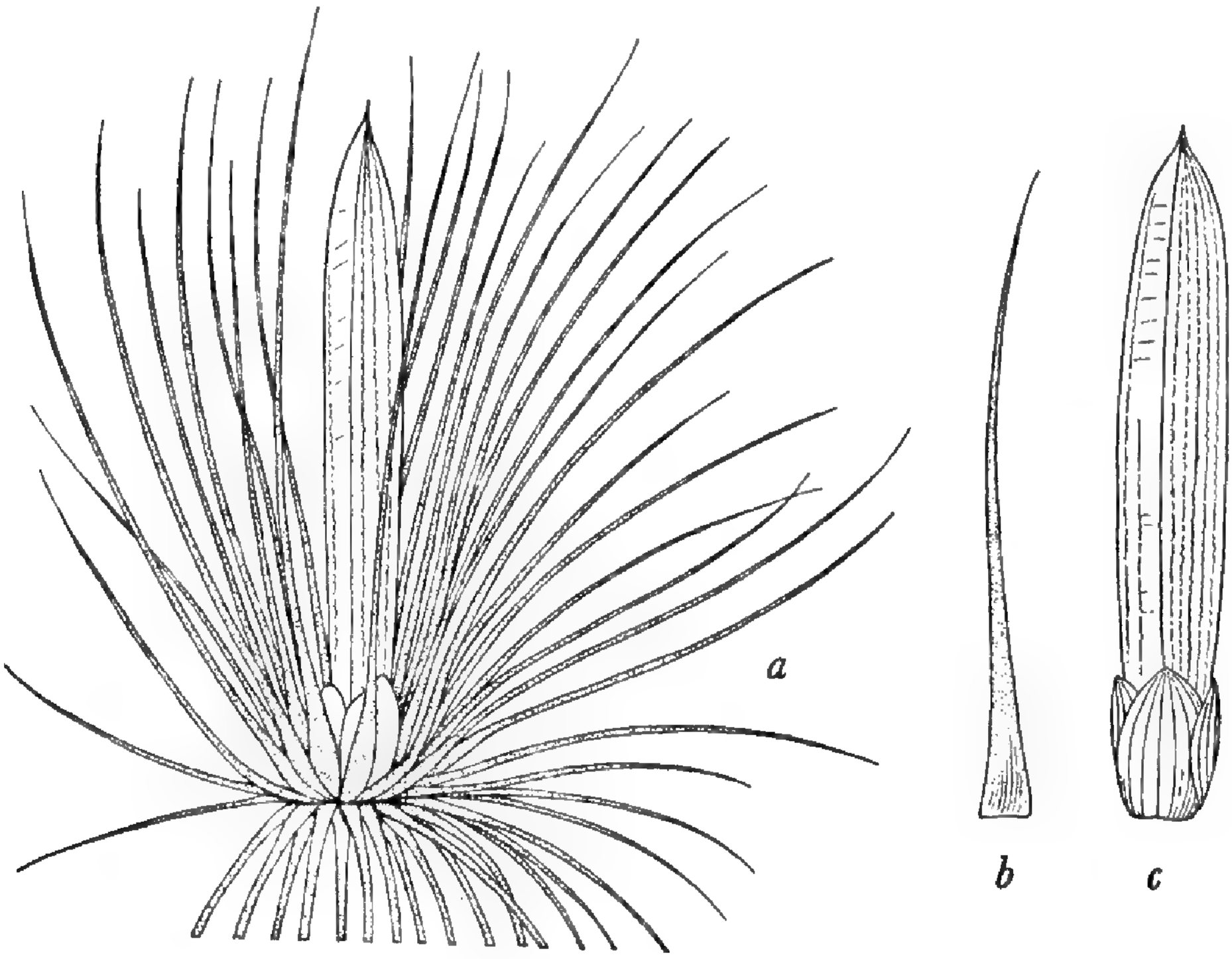

FIGURE 54.—*Tillandsia andreana: a*, Habit, ×1; *b*, leaf, ×1; *c*, sepals and capsule, ×1, after André, Brom. Andr.

Plant varying from the typically stemless phase to long-caulescent; leaves scarcely more than 5 cm. long, densely lepidote throughout with appressed cinereous or brownish scales; sheaths distinct, triangular-ovate, about 5 mm. long; blades erect to recurved, linear, 1–2 mm. wide, filiform-acuminate, strongly keeled below; scape none; inflorescence terminal, consisting of a single flower or rarely two; floral bract lance-oblong, acute, membranaceous, 1-nerved, glabrous, not more than half as long as the sepals; sepals elliptic-ovate, obtuse, about 15 mm. long, chartaceous, even, glabrous, free; petals erect, up to 44 mm. long, red; stamens and pistil exserted.

ILLUSTRATIONS: Brom. Andr. *Pl. 29, fig. B*; Proc. Amer. Acad. **70**: no. 5: *pl. 4, fig. 1.*

TYPE LOCALITY: On trees, Río de la Honda, near the Bridge of Icononzo, Pandi, Colombia. Type collected by André (No. 1762).

DISTRIBUTION: Venezuela, Colombia.

VENEZUELA:

MÉRIDA: Laderas de San Pablo near Mérida, alt. 500–700 m., ca. 1846, *Funck & Schlim* 1258 (BM, type of *Tillandsia funckiana* Baker; P); Río Chama, alt. 600 m., April 15, 1922, *Jahn* 1088 (GH, NY, US). El Morro, alt.1,750 m., Jan. 14, 1911, *Jahn* 78 (US). Between Estanques and Puente Real, San Juan to El Vegon, alt. 400–1,100 m., Feb. 2, 1928, *Pittier* 12846 (NY, US). On dry perpendicular rocks at El Molino, just above Lagunillas, alt. 1,250 m., April 29, 1944, *Steyermark* 56217 (GH). Andes of Mérida, near Mérida, Jan. 1950, *Marcuzzi* (US).

COLOMBIA:

MAGDALENA: High in trees, Manaure, Sierra Perijá and Sierra de Santa Marta, alt. 1,050 m., Aug. 24, 1946, *Foster & E. Smith* 1476 (GH).

NORTE DE SANTANDER: Gramalote (Cúcuta), Dec. 1940, *Maria* 2558 (GH).

CUNDINAMARCA: On trees, Río de la Honda, near the Bridge of Icononzo, Pandi, alt. 1,640 m., Feb. 1876, *Andrê* 1762 (K, type).

TOLIMA: Epiphytic, Río Icononzo, alt. 900 m., Oct. 13, 1946, *Foster* 1884 (GH).

Recent collections show that the distinction of caulescent against acaulescent between *Tillandsia funckiana* and *T. andreana* does not hold.

10. Tillandsia (Tillandsia) **exserta** Fernald, Bot. Gaz. **20**: 537. 1895.

FIGURE 55

Tillandsia cinerea Mez in DC. Monogr. Phan. **9**: 679. 1896. Not Raf. 1840.

Stemless, 2–7 dm. high; leaves many in a dense rosette, up to 3 dm. long, densely lepidote throughout with coarse pale cinerous subspreading scales; sheaths ovate, conspicuous; blades coiled-recurving, very narrowly triangular, long-acuminate, involute, 3–4 mm. in diameter at the base; scape erect, 3 mm. in diameter, glabrous; scape-bracts erect, involute, imbricate, the lower foliaceous, the upper elliptic, acute or apiculate, densely appressed-lepidote; inflorescence simple or subdigitately compound, up to 18 cm. long; primary bracts

like the upper scape-bracts, much shorter than the axillary branches; axes slender, glabrous; spikes erect or slightly divergent, linear-lanceolate, acute, 5–14 cm. long, 8–15 mm. wide, subsessile with a few sterile bracts at the base or the terminal spike sometimes stipitate,

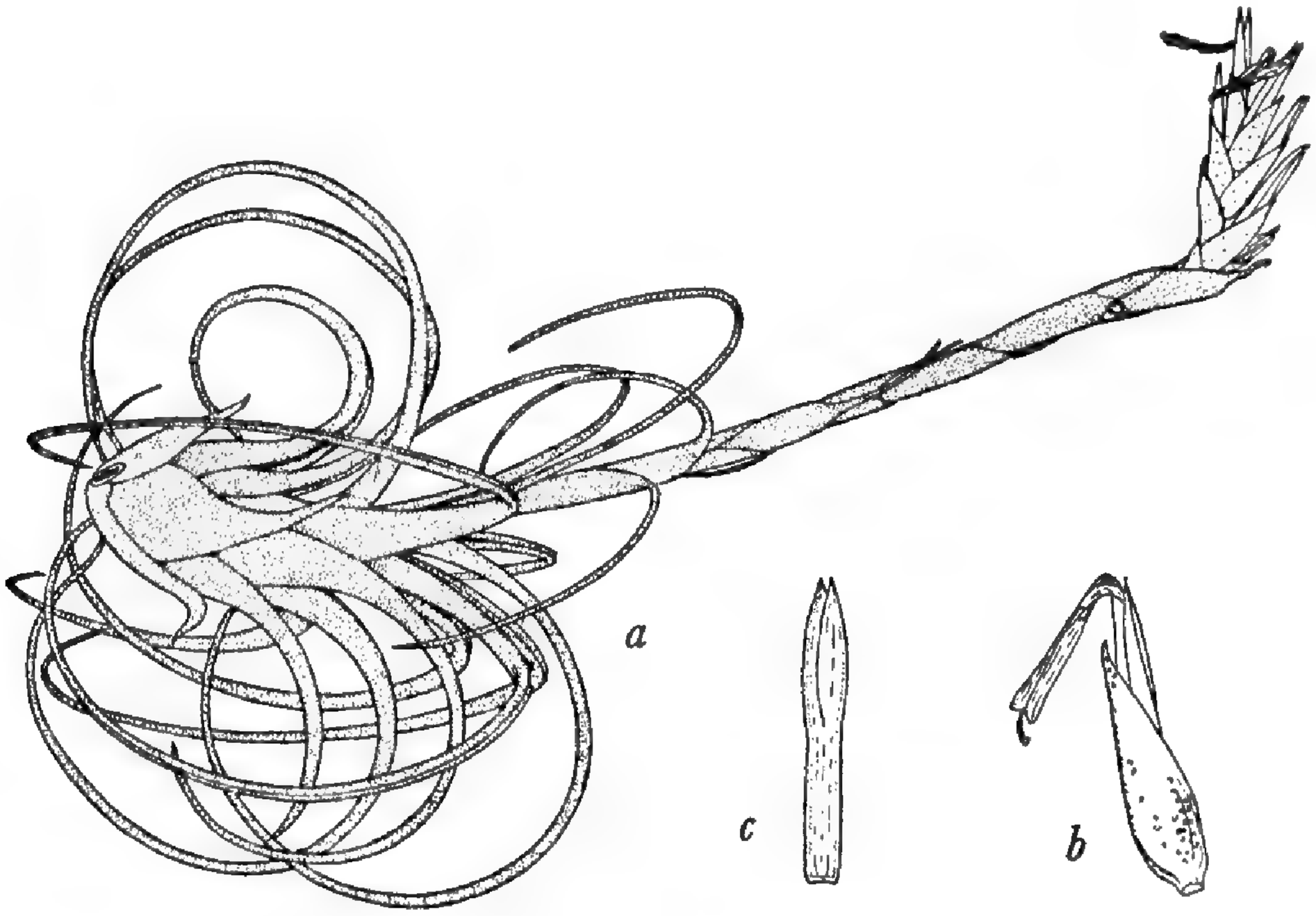

FIGURE 55.—*Tillandsia exserta: a*, Habit, ×1/2; *b*, floral bract and flower, ×1; *c*, posterior sepals, ×1.

complanate, dense, about 12-flowered; rhachis angled, straight; floral bracts erect, densely imbricate, broadly ovate, acute, 2 cm. long, distinctly shorter than the sepals at anthesis, over three times as long as the internodes, straight, ecarinate, subcoriaceous, usually even except near the apex, densely appressed-lepidote, often red; flowers subsessile, erect; sepals linear-lanceolate, acute, up to 26 mm. long, carinate, coriaceous, even, connate posteriorly for about half their length; petals erect, linear, acute, 35 mm. long, violet; stamens and pistil exserted; capsule slenderly cylindric, acute, 3 cm. long.

ILLUSTRATIONS: Contr. Gray Herb. **98:** *pl. 4, figs. 10, 11.*

TYPE LOCALITY: Mazatlán, Sinaloa, Mexico. Type collected by Lamb (No. 381).

DISTRIBUTION: Northwestern Mexico.

MEXICO:

SONORA: Agiabampo, 1890, *Palmer* 805 (GH, US, type collection of *Tillandsia cinerea* Mez).

SINALOA: Mazatlán, Jan. 2, 1895, *F. H. Lamb* 381 (GH, type; DS); Mar. 31, 1910, *Rose, Standley, & Russell* 13793 (NY, US); Nov. 1926, *Ortega* 6477 (GH, US); 1926, *Reiche* 372 (M). Altata, 1903, *Purpus* (UC). Yerba Buena, vicinity of Culiacán, Oct. 10, 1904, *T. S. Brandegee* (UC). On shrubs, vicinity of Topolobampo, Mar. 23, 1910, *Rose, Standley, & Russell* 13345 (F, GH, NY, US). Vicinity of Guadalupe, April 18, 1910, *Rose,*

Standley, & Russell 14755 (US). Villa Unión, alt. 25 m., Dec. 1921, *Ortega* 4351 (US). El Norote, alt. 10 m., 1925, *Ortega* 5929 (US). On trees, deciduous woods on rolling hills, "La Noria," Oct. 13, 1925, *Mexia* 337½ (MO, UC). Los Mochis, near San Blas, Jan. 30, 1927, *Jones* 23458 (MO, POM). Conchi, municipio of Mazatlán, Nov. 1934, *Ortega* 7452 (MO). Eighteen miles west of Culiacan, thorn forest, coastal plain, alt. 45 m., Dec. 1944, *Gentry* 7117 (GH, US).

11. Tillandsia (Phytarrhiza) **aurea** Mez, Repert. Nov. Sp. Fedde **3:** 44. 1906.

FIGURE 56

Stemless, 3 dm. high; leaves forming a slightly irregular subutriculate rosette; sheaths scarcely distinct from the blades, glabrous toward base; blades narrowly triangular, acuminate, 75 mm. long,

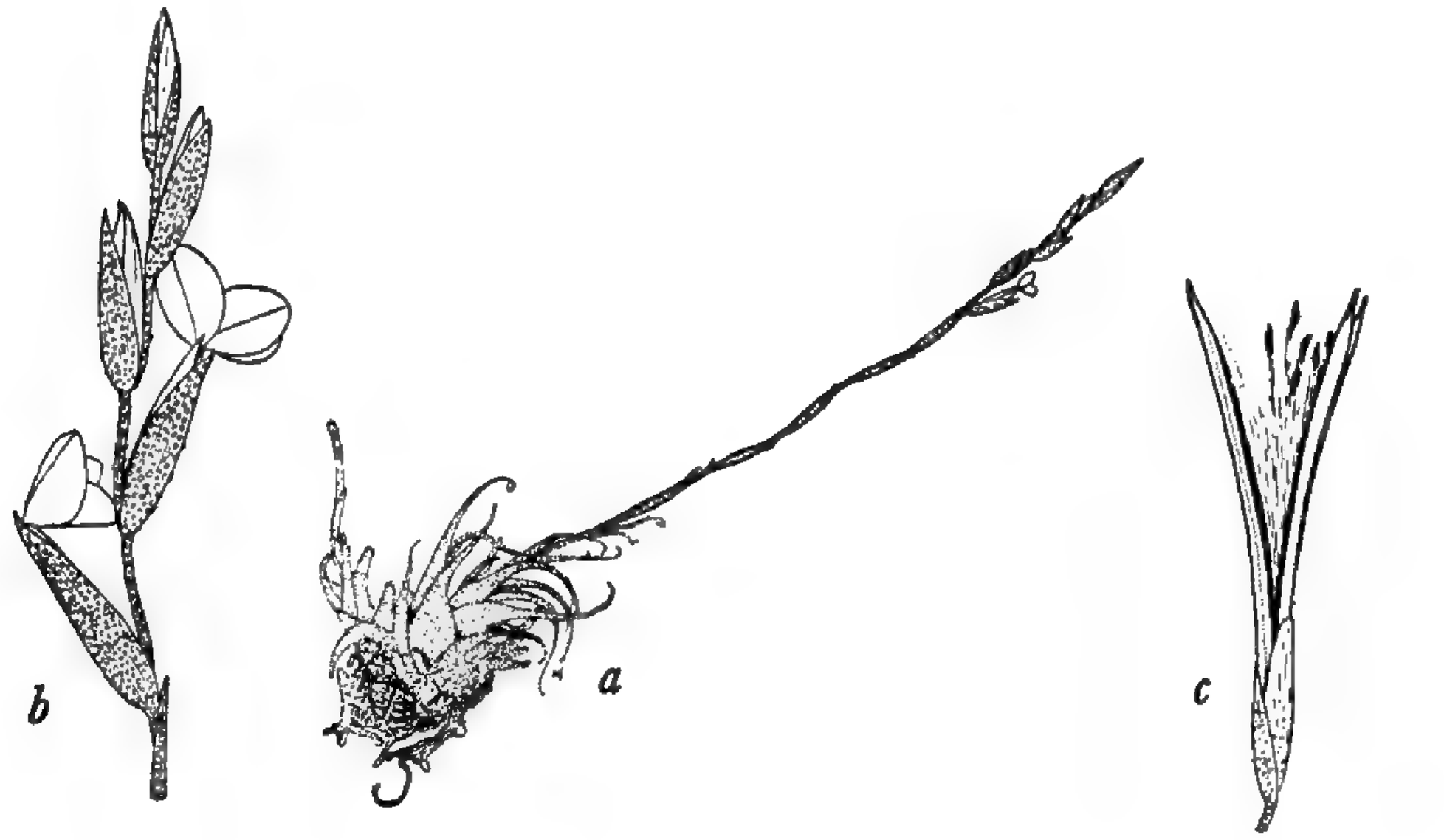

FIGURE 56.—*Tillandsia aurea: a*, Habit, ×1/4; *b*, inflorescence, ×1; *c*, floral bract, sepals, and capsule, ×1. (Drawn by R. J. Downs.)

15 mm. wide at base, uncinate-recurved, coarsely pruinose-lepidote; scape erect, elongate, slender, lepidote; scape-bracts narrow, acute or the lowest laminate, mostly shorter than the internodes, submembranaceous, densely lepidote; inflorescence simple, lax, 6-flowered, 9 cm. long; axis undulate, densely lepidote; floral bracts elliptic, acute, 14 mm. long, shorter than the sepals, ecarinate, slightly incurved toward apex, submembranaceous, red-brown when dry, lepidote; flowers divergent; pedicels stout, 2.5 mm. long; sepals lanceolate, acute, about 15 mm. long, glabrous; petals yellow, the blades spreading, 1 cm. long, broadly elliptic; stamens deeply included, exceeding the pistil; capsule cylindric, acuminate, 35 mm. long.

TYPE LOCALITY: Puccha Valley above Masín, Department of Ancash, Peru. Type collected by Weberbauer (No. 3297).

DISTRIBUTION: Known only from the type collection.

PERU:

ANCASH: Prov. Huari: On shrubs, Puccha Valley above Masín, alt. 2,600–2,700 m., July 5, 1903, *Weberbauer* 3297 (Berlin, type, Macbride photo No. 11480).

12. Tillandsia (Allardtia) **ignesiae** Mez, Bull. Herb. Boiss. II. **3:** 143. 1903.

FIGURE 57

Stemless, 10–17 cm. high; leaves many in a very dense subglobose rosette, about equaling the inflorescence, densely and finely tomentose-

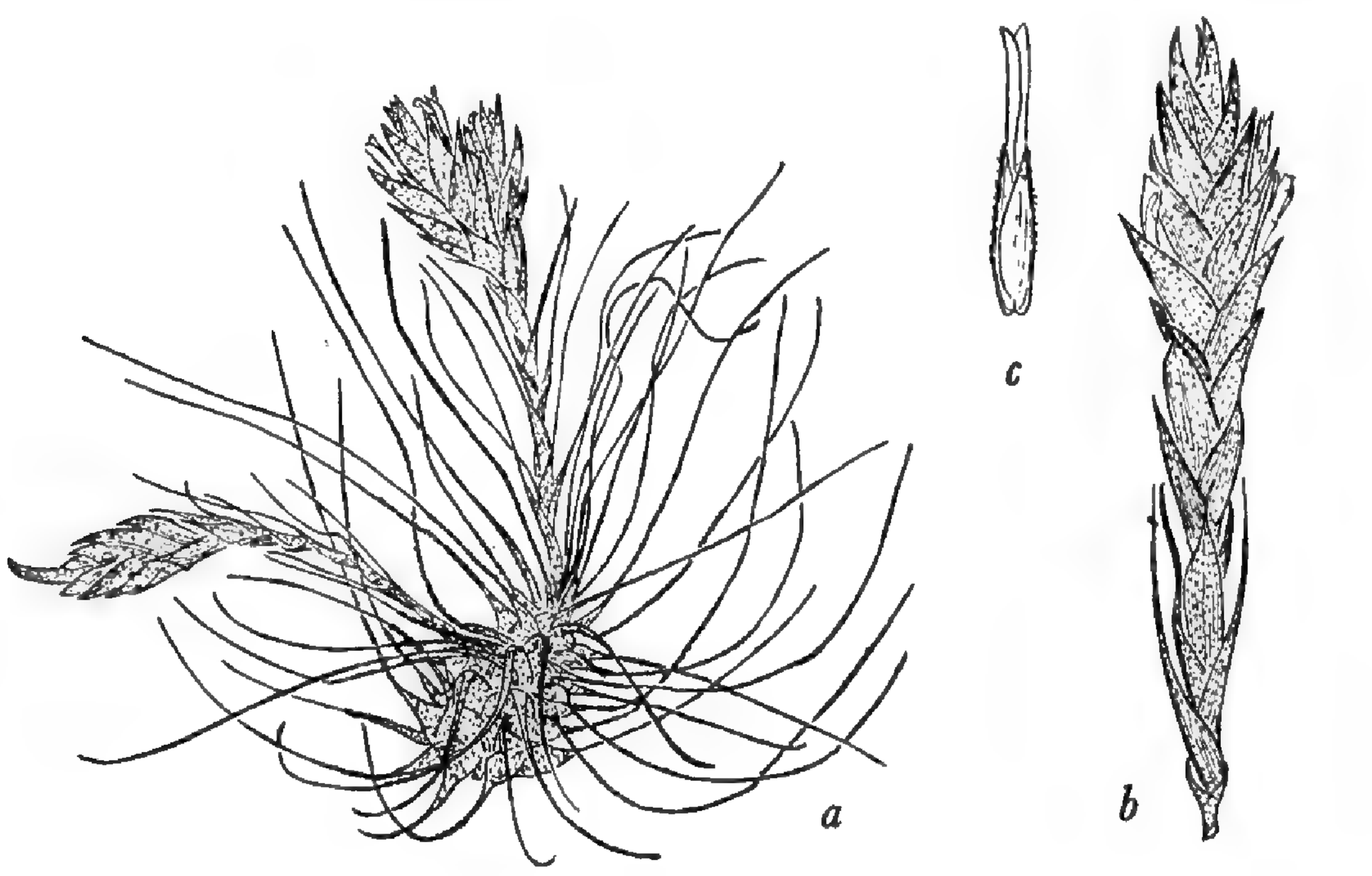

FIGURE 57.—*Tillandsia ignesiae; a*, Habit, ×1/2; *b*, scape and inflorescence, ×1; *c*, flower dorsal view, ×1. (Drawn by R. J. Downs.)

lepidote throughout with spreading or reflexed cinereous scales; sheaths suborbicular, 8–10 mm. wide, pale; blades linear-subulate, filiform-acuminate, about 1 mm. thick, the outer ones reflexed; scape erect or ascending, very slender; scape-bracts erect, densely imbricate, elliptic with long filiform blades, membranaceous, densely lepidote; inflorescence simple, lanceolate or linear-lanceolate, acute, 25–55 mm. long, 12 mm. wide, strongly complanate, dense; floral bracts erect or slightly spreading toward apex, triangular-ovate, acuminate, up to 19 mm. long, much exceeding the sepals, four times as long as the internodes, sharply carinate, membranaceous at anthesis, somewhat indurated in fruit, prominently many-nerved, densely lepidote; flowers sessile; sepals lanceolate, acute, 12 mm. long, carinate, membranaceous, subtomentose-lepidote especially along the keel, nerved, connate posteriorly for about 1 mm.; petals ligulate, obtuse, 18 mm. long, greenish yellow when dry; stamens and pistil included; capsule cylindric, stout, short-beaked, 20–25 mm. long.

TYPE LOCALITY: Monte de Santa Ignes, Michoacan, Mexico. Type collected by Langlassé (No. 93).

DISTRIBUTION: Southern Mexico.

MEXICO:

MÉXICO: District of Temascaltepec: On an oak, Nanchititla, April 10, 1933. *Hinton* 3762 (GH, K, NY, US); May 18, 1935, *Hinton* 7780 (K).

MICHOACÁN: Epiphytic, flowers from Monte de Santa Ignes, fruits from Las Seneguias, alt. 1,500 m., April 4, 1908, *Langlassé* 93 (GH, P, US, type collection).

GUERRERO: District of Mina: Epiphytic, oak woods, Zacatlán, alt. 1,500 m., April 26, 1937, *Hinton* 10102 (GH, MO).

13. Tillandsia (? Allardtia) **chaetophylla** Mez in DC. Monogr. Phan. **9:** 726. 1896. FIGURE 58

Tillandsia subulata E. Morr. ex Baker, Handb. Bromel. 170. 1889. Not Vell. 1825.

Stemless, 2–4 dm. high; leaves many in a dense fasciculate rosette, mostly equaling or exceeding the inflorescence, erect or variously curved, densely appressed-lepidote throughout; sheaths conspicuous, triangular, ferruginous; blades linear-subulate to filiform; scape erect or ascending, slender; scape-bracts erect, involute, densely imbricate, the lower foliaceous, the upper ovate, acute, filiform-caudate, membranaceous, pale red; inflorescence simple, lanceolate, acute, 4–8 cm. long, densely 3–8-flowered, strongly complanate; floral bracts erect, imbricate, lance-ovate, acute, 25–35 mm. long, 10 mm. wide, exceeding the sepals and about five times as long as the internodes, carinate toward the apex, densely and finely appressed-lepidote, red, membranaceous, more or less prominently nerved; flowers subsessile; sepals lanceolate, acuminate, up to 3 cm. long, chartaceous, glabrous, joined posteriorly for almost half their length; petals ligulate, obtuse, apiculate, 5–7 cm. long, violet; stamens included as far as known; pistil slightly exserted.

TYPE LOCALITY: "Mexico, loco ignoto." Type from the herbarium of Pavon without indication of the collector.

DISTRIBUTION: Southern Mexico.

MEXICO: Hb. Pavon (BM, lectotype); *Sessé & Mociño* 5443 (F); *Uhde* 182 (Berlin, type of *Tillandsia subulata* E. Morr.); Los Gallitos, (*collector unknown*) 272 (Liége).

VERA CRUZ: Maltrata, May 6, 1937, *Matuda* 1190 (GH, MO).

MÉXICO: District of Temascaltepec: On the oak no. 3481, La Sierrita, Mar. 7, 1933, *Hinton* 3468 (K, NY, US). District of Sultepec: Epiphytic, Almoloya, Mar. 26, 1935, *Hinton* 7449 (GH, NY).

MICHOACÁN: On tree-trunks, near Morelia, 1909, *Arsène* (GH, NY). Cerro Azul, near Morelia, alt. 2,200 m., May 5, 1910, *Arsène* 5363 (GH, US).

OAXACA: *Jurgensen* 13 (Geneva, Macbride photo No. 25259). On oaks, Coyula, April 24, 1895, *L. C. Smith* 557 (GH). District of Pochutla: Cerro de la Virgen, alt. 2,000 m., Feb. 1941, *Reko* 6213 (GH).

The lectotype of *Tillandsia chaetophylla* from the herbarium of Pavon is probably the same collection as the Sessé and Mociño material, since Pavon's Mexican specimens appear to have been largely if not entirely from this source. There is a collection of this

species purportedly made by Hioram in Puerto Rico, but the label is probably a falsification by a certain dealer in exsiccatae.

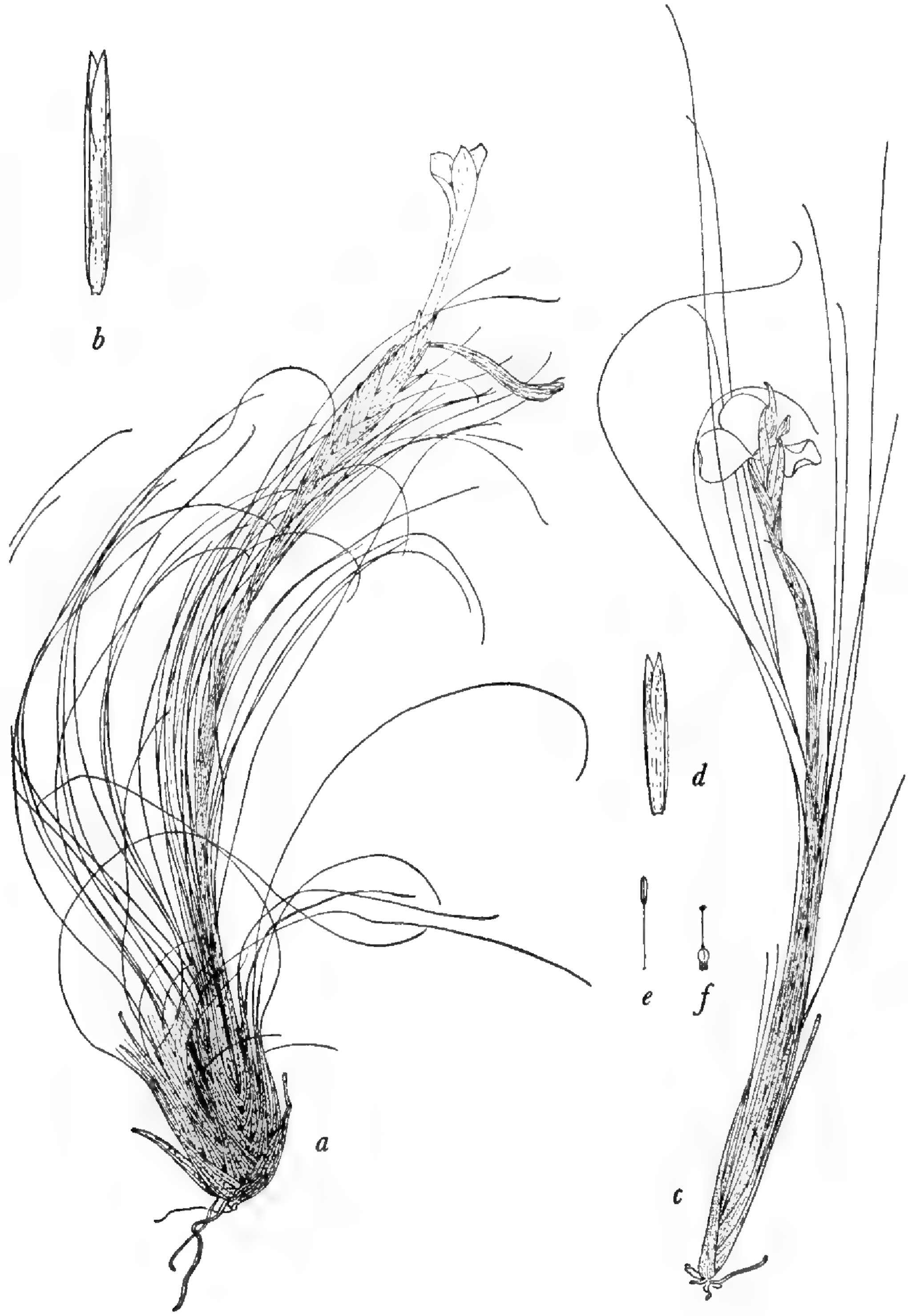

FIGURE 58.—*Tillandsia chaetophylla: a*, Habit, ×1/2; *b*, posterior sepals ×1. *Tillandsia linearis: c*, Habit,×1/2; *d*, posterior sepals, ×1; *e*, stamen, ×1; *f*, pistil, ×1.

14. Tillandsia (Phytarrhiza) **linearis** Vell. Fl. Fluminensis 133. 1825; Icon. **3**: *pl. 128*. 1835. FIGURE 58

Anoplophytum lineare Beer, Bromel. 42. 1857.

Tillandsia selloa K. Koch, Ind. Sem. Hort. Berol. 1873, Appendix **4**: 7. 1874.

Phytarrhiza linearis E. Morr. Belg. Hortic. **29**: 370. 1879.

Tillandsia setacea sensu Baker, Handb. Bromel. 175. 1889, in part, as to the synonym, *T. selloa*. Not Sw. 1797.

Stemless, 13–25 cm. high; leaves about 10–20, erect or suberect, subfasciculate, up to 38 cm. long, always exceeding the inflorescence, completely covered with small appressed cinereous scales; sheaths evident, triangular; blades linear, very slender, filiform-acuminate, 1–2 mm. thick at base; scape erect, very slender; scape-bracts imbricate and wholly covering the scape, the lower ones subfoliaceous, the upper lanceolate, acute; inflorescence simple, narrowly lanceolate, strongly compressed, densely few-flowered, 30–45 mm. long, 6–10 mm. wide; floral bracts erect, imbricate and more or less covering the rhachis, elliptic, acute, about 2 cm. long, exceeding the sepals, convex but scarcely carinate, membranaceous, strongly nerved, red, lepidote; flowers sessile; sepals free, lanceolate, acuminate, up to 19 mm. long, carinate, glabrous; petal-claw linear, blade suborbicular, 10–14 mm. in diameter, spreading, violet (! Hoehne) or blue; stamens deeply included but exceeding the style; capsule slender, acute, up to 32 mm. long.

TYPE LOCALITY: No locality cited; presumably the state of Rio de Janeiro from the title "Flora Fluminensis," but it could be the state of São Paulo, which was partially covered by Vellozo.

DISTRIBUTION: Southeastern Brazil.

BRAZIL:

GOIAZ: Serra dos Veadeiros, Jan. 8, 1895, *Glaziou* 22197 (P).

RIO DE JANEIRO: Serra de Nova Friburgo, *Saldanha in hb. Schwacke* 4586 (Berlin, ! Mez).

SÃO PAULO: Santo Amaro, Nov. 20, 1893, *Edwall* 12381 (SP). São Bernardo, Oct. 26, 1913, *Brade* 6744 (SP). Butantan, Oct. 31, 1917, *Hoehne* 823 (SP); Sept. 28, 1920, *Gehrt* 4571 (SP). Near Una, Aug. 23, 1939, *Foster* 384 (GH). Cotia (cultivated in São Paulo), Oct. 14, 1940, *M. Kuhlmann* 44425 (SP). In mato, Paiol do Meio, *Gehrt* 44418 (SP).

PARANÁ: Near Curitiba, 1828, *Sellow* 4864 (GH). Campo, Curitiba, Dec. 1884, *Galvão in hb. Saldanha* 8839 (Mus. Nac. Rio). On trunks of *Araucaria angustifolia*, Itaiacóca near Ponta Grossa, Mar. 17, 1904, *Dusén* 4240 (Mus. Nac. Rio, S). On trees in mato, Jacarehy, alt. 885 m., Sept. 22, 1908, *Dusén* 6816 (S); on tree trunks, restinga near the sea, Sept. 21, 1914, *Dusén* 15555 (GH, S). On trunks of *Araucaria angustifolia* in mato, Itaperussú, Oct. 17, 1910, *Dusén* 7397 (BM, S, US). In mato, Pinhaes (cultivated until flowering), alt. 885 m., Dec. 17, 1910, *Dusén* 11592 (S); on tree trunks, Nov. 6, 1914, *Dusén* 15852 (GH, S, US). Epiphytic in dense masses, forest, 29 km. east of Curitiba on the road to Paranaguá, alt. 930 m., Dec. 15, 1947, *Tessmann* 2770 (US).

15. Tillandsia (Allardtia) **rhomboidea** André, Énum. Bromél. 6. Dec. 13, 1888; Rev. Hort. **60:** 566. Dec. 16, 1888. FIGURE 59

Stemless; leaves rosulate, stiff, 15–20 cm. long, densely cinereous-lepidote; sheaths distinct; blades narrowly triangular, involute-

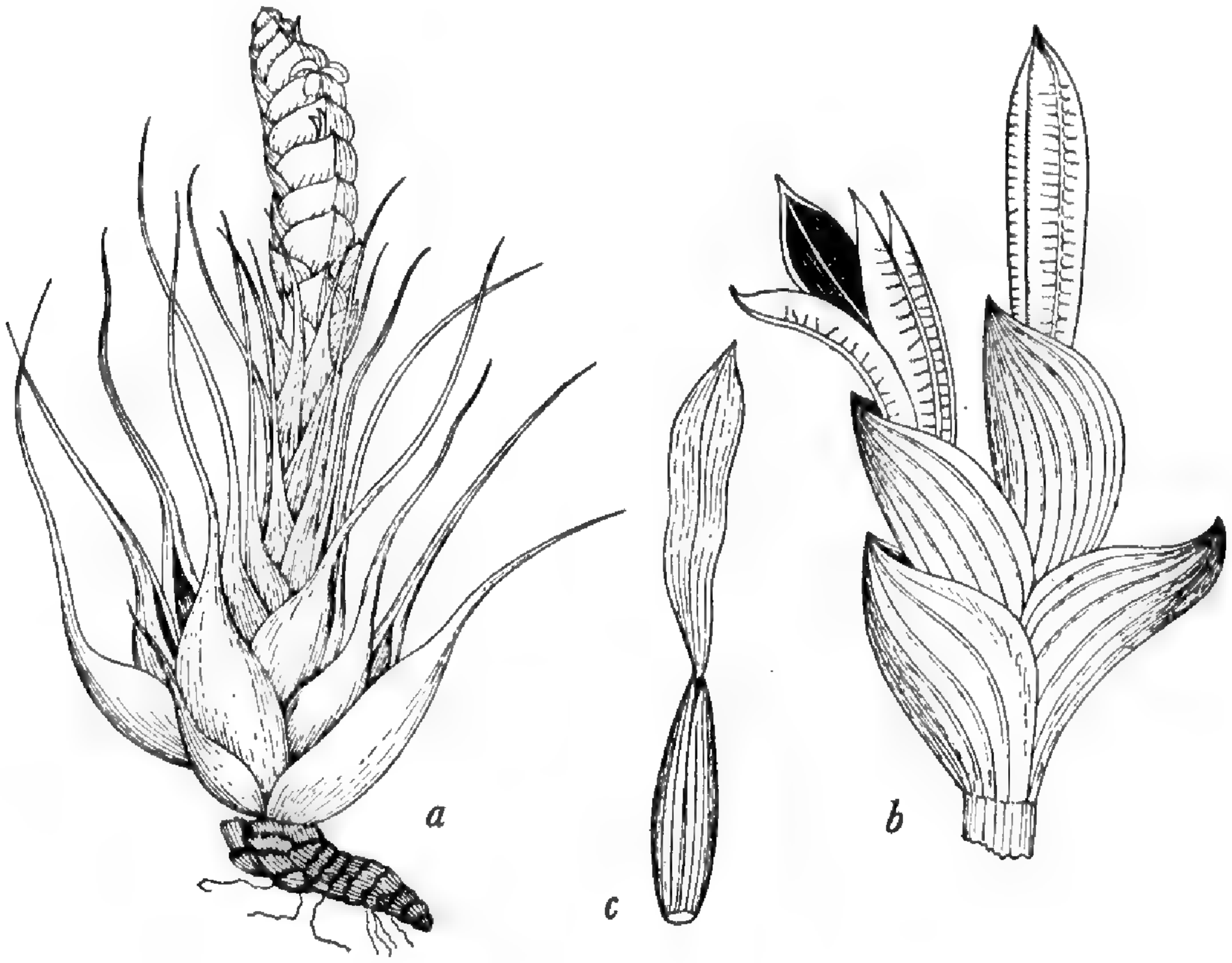

FIGURE 59.—*Tillandsia rhomboidea: a*, Habit, ×1/3; *b*, section of fruiting inflorescence, ×1; *c*, flower, ×1, after André, Brom. Andr.

subulate, filiform-acuminate; scape short but distinct, erect, stout; scape-bracts imbricate, subfoliaceous; inflorescence simple, dense, 10–12 cm. long, about equaling the leaves, slightly complanate with strongly convex sides; rhachis not excavated; floral bracts broadly rhombic, acute and apiculate, twice as long as the sepals, rose-purple, sparsely lepidote, the dorsal nerve prominent; sepals lanceolate, acute, free anteriorly, completely connate posteriorly; petals three times as long as the sepals, about equaling the stamens, violet, their blades spreading to recurved, broadly obovate.

ILLUSTRATIONS: Brom. Andr. *pl. 20.*

TYPE LOCALITY: Piedra de Moler on the banks of the Río de la Vieja, Cauca Valley near Cartago, Colombia. Lectotype collected by André (No. 2745 in part).

DISTRIBUTION: Known only from the original collections.

COLOMBIA:

EL VALLE: Piedra de Moler on the banks of the Río de la Vieja, Cauca Valley near Cartago, alt. 900 m., Mar. 15, 1876, *André* 2745 in part (K, lectotype; NY). Banks of the Río Bitaco, near Cali, alt. 1,000 m., Mar.–Apr., 1876, *André* 2745 in part (K, NY).

André followed the unfortunate practice of including several collections under a single number as long as he considered them to be all of the same species. I have chosen the collection from Piedra de Moler as the type, because it appears to be the basis of his illustration.

16. Tillandsia (Phytarrhiza) **pretiosa** Mez, Repert. Sp. Nov. Fedde **16:** 78. 1919.

Stemless, flowering plant 5 dm. high; leaves densely rosulate, 6 dm. long; blades linear-triangular, acuminate, 20 mm. wide, chartaceous, subglabrous; scape distinct; scape-bracts densely imbricate, the lower with short recurving blades, the upper ovate-elliptic, abruptly acute, subpungent, coriaceous; inflorescence simple, to 18-flowered, strongly complanate, 20 cm. long, 11 cm. wide; floral bracts subspreading at anthesis, scarcely imbricate or concealing the rhachis, 55 mm. long, distinctly exceeding the sepals, hardly incurved at the apex, coriaceous, even, glabrous; flowers suberect; sepals free, elliptic, acuminate, to 45 mm. long, carinate, the margin membranaceous; petals imperfectly known, about 8 cm. long when erect, blue when dry, blades large and spreading; stamens and pistil unknown.

TYPE LOCALITY: Valley of Mindo, Ecuador. Type collected by Sodiro (No. 171/39).

DISTRIBUTION: Known only from the type collection.

ECUADOR:

PICHINCHA: Valley of Mindo, *Sodiro* 171/39 (Berlin, type).

Mez cites the locality as "Minda" but probably refers to the Río Mindo northwest of Quito where Sodiro did much of his collecting.

17. Tillandsia (Allardtia) **lampropoda** L. B. Smith in Yuncker, Field Mus. Publ. Bot. **17:** 320, *pl. 9.* 1938. FIGURE 60

Stemless, to 50 cm. high; leaves many in a slenderly cyathiform rosette, 35–40 cm. long, sheaths oblong-elliptic, 1 dm. long, densely and obscurely punctulate-lepidote, bright purple; blades very narrowly triangular, caudate-acuminate, 15–30 mm. wide, densely appressed-cinereous-lepidote; scape erect, 6 mm. thick, glabrous; scape-bracts imbricate, broadly ovate, apiculate or the lowest caudate-laminate, very obscurely punctulate, even, lustrous, red; inflorescence simple, elliptic, acute, strongly complanate, 15–18 cm. long, 45–70 mm. wide; floral bracts densely imbricate, broadly ovate, acute, to 55 mm. long, sharply carinate, coriaceous, even, lustrous, yellow, green or red, cinereous-lepidote toward the apex; flowers subsessile; sepals free, narrowly lanceolate, acute, 32 mm. long, carinate, coriaceous, nerved, glabrous; petals linear, 5–6 cm. long, equaling the stamens, yellow; style exserted.

TYPE LOCALITY: On tree near El Achote, above plains of Siguatepeque, Comayagua, Honduras. Type collected by Yuncker, Dawson, and Youse (No. 5895).

DISTRIBUTION: Guatemala, Honduras.

GUATEMALA:

HUEHUETENANGO: Epiphytic, cloud forest, between Xoxlac and Nucapoxlac, Sierra de los Cuchumatanes, alt. 1,650–2,500 m., July 17, 1942, *Steyermark* 48964 (F).

ALTA VERAPAZ: On tree, near Tactic, alt. ca. 1,500 m., April 10, 1941, *Standley* 92019 (F); alt. ca. 1,450 m., April 14, 1941, *Standley* 92344 (F); alt. 1,300 m., Feb. 20, 1942, *Steyermark* 44004 (F, GH, US). San Cristóbal, Mar. 23, 1946, *Carlson* (F).

BAJA VERAPAZ: On tree in forest of pine and oak, dry rocky hills north of Santa Rosa, Mar. 30, 1939, *Standley* 69778 (F).

QUEZALTENANGO: On tree in damp dense mixed forest on white sand slopes, above Mujuliá, between San Martín Chile Verde and Colomba, alt. ca. 1,800 m., Feb. 1, 1941, *Standley* 85532 (F).

ZACAPA: Between Cerro de Monos and upper slopes of Monte Virgen, alt. 2,000–2,600 m., Jan. 17, 1942, *Steyermark* 42890 (F). On tree along river, upper reaches of Río Sitio Nuevo, alt. 1,500–1,800 m., Jan. 25, 1942, *Steyermark* 43210 (F, GH).

SUCHITEPÉQUEZ: Epiphytic, upper forested slopes of barranco by Loma Grande, above Finca El Naranjo, on Volcán Santa Clara, alt. 1,950–2,100 m., June 2, 1942, *Steyermark* 46839 (F).

HONDURAS:

COMAYAGUA: On tree, near El Achote, above the plains of Siguatepeque, alt. 1,350 m., July 15, 1936, *Yuncker, Dawson, & Youse* 5895 (GH, type).

18. Tillandsia (Phytarrhiza) **anceps** Lodd. Bot. Cab. **8:** *pl. 771.* 1823.

FIGURE 60

Platystachys anceps Beer, Bromel. 80. 1857.
Vriesea anceps Lem. Ill. Hort. **6:** misc. 15. 1859.
Tillandsia xiphostachys Griseb. Nachr. Ges. Wiss. Goett. for **1864:** 14. 1865, in part.
Phytarrhiza anceps E. Morr. Belg. Hort. **29:** 368, *pl. 20, 21.* 1879.
Vriesea schlechtendahlii Wittm. Bot. Jahrb. Engler **11:** 69. 1889. Excl. syn.
Vriesea schlechtendahlii var. *alba* Wittm. Bot. Jahrb. Engler **11:** 69. 1889.
Tillandsia lineatifolia Mez in DC. Monogr. Phan. **9:** 686. 1896.
Tillandsia compressa sensu Kenoyer & Standl. Field Mus. Publ. Bot. **4:** 147. 1929. Not Bertero.

Stemless; leaves numerous, densely rosulate, 15–40 cm. long, equaling or exceeding the inflorescence, very densely and minutely pale-appressed-lepidote throughout, green; sheaths triangular-ovate, longitudinally red-striate; blades recurving, narrowly triangular, acuminate, 7–12 mm. wide at the base; scape erect, stout, very short and largely hidden by the leaves; scape-bracts erect, densely imbricate, ovate, acute or the lowest with a stiff erect linear blade, much smaller than the floral bracts, coriaceous, even, glabrous; inflorescence simple, elliptic, strongly complanate, 10–15 cm. long, 55 mm. wide, densely 10–20-flowered, glabrous; floral bracts suberect, densely imbricate, triangular-acute, up to 4 cm. long, much exceeding the sepals, strongly carinate, coriaceous, even, somewhat shiny, green or pale rose with greenish margins; flowers short-pedicellate; sepals narrowly lanceo-

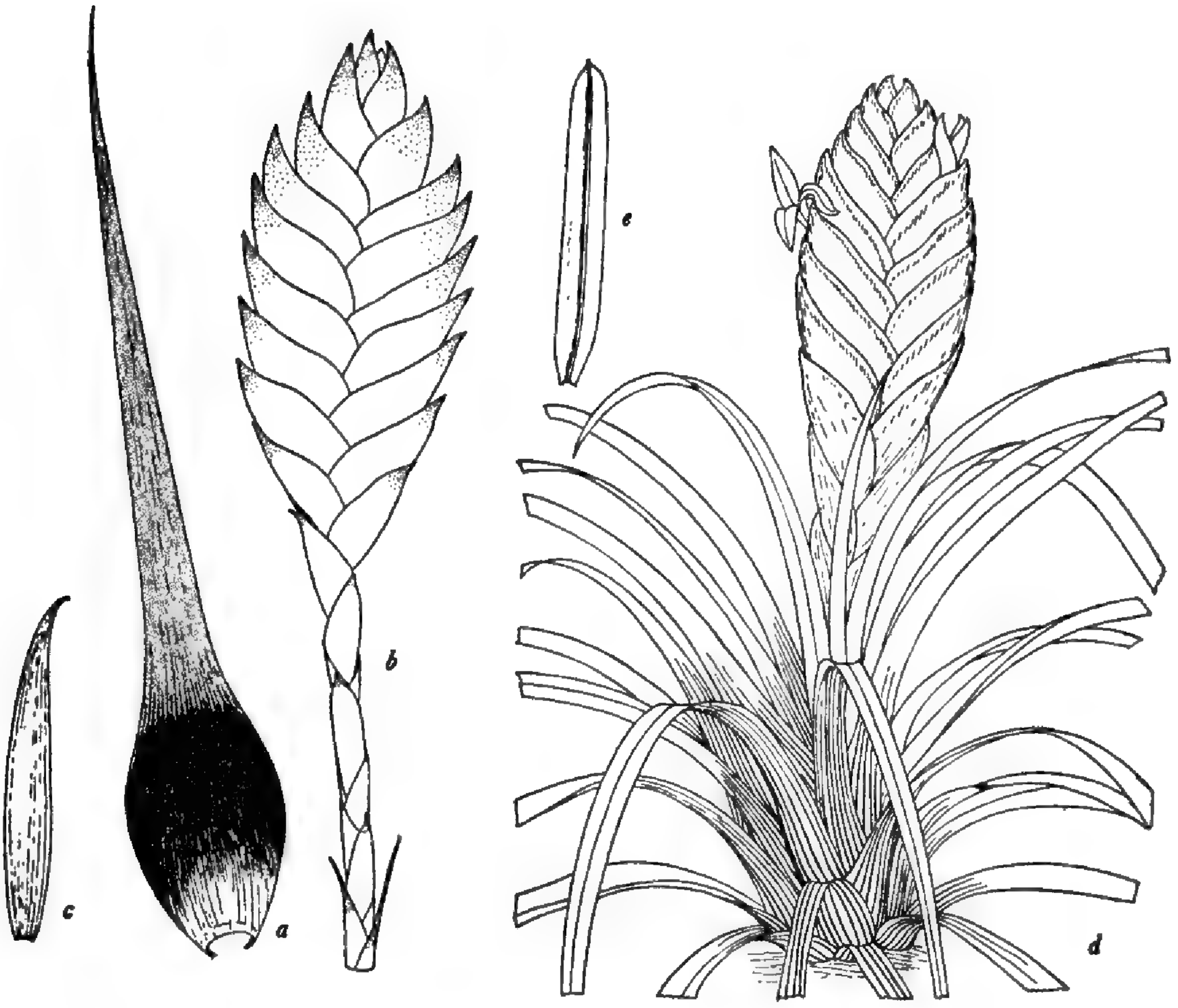

FIGURE 60.—*Tillandsia lampropoda: a*, Leaf, ×1/3; *b*, scape and inflorescence, ×1/3; *c*, sepal, lateral view, ×1. *Tillandsia anceps: d*, Habit, ×1/3, after E. Morren, Belg. Hort.; *e*, sepal, ×1.

late, acute, 3 cm. long, coriaceous, even, equally subfree, carinate; petals more than twice as long as the sepals, the claw linear, white, the blade spreading, lance-elliptic, acute, blue or rarely white; stamens deeply included, exceeding the style; capsule slenderly cylindric, shorter than the sepals.

ILLUSTRATIONS: Ann. Missouri Bot. Gard. **31:** *fig. 107*; Field Mus. Publ. Bot. **10:** *pl. 13.*

TYPE LOCALITY: "Trinidad." Described from cultivation.

DISTRIBUTION: Central America, Trinidad, northern South America.

GUATEMALA:

ALTA VERAPAZ: Along Río Icvolai between Río Apia and Río Soctelá, 8–10 miles northwest of Cubilgüitz, alt. 200–210 m., Mar. 14, 1942, *Steyermark* 45087 (F).

IZABAL: Jungle epiphyte, Río Chacón, alt. 30 m., Mar. 1921, *Johnson* 1295 (US). Epiphytic, damp forested slopes and barrancos, Cerro San Gil, alt. 300–900 m., Dec. 25, 1941, *Steyermark* 41894 (F).

BRITISH HONDURAS:

STANN CREEK DISTRICT: On tree in high ridge on hilltop, Middlesex, Oct. 20, 1939, *Gentle* 3040 (GH). Stann Creek Valley, Antelope Ridge, Feb. 1940, *Gentle* 3191 (GH).

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HONDURAS:

ATLÁNTIDA: On tree in wet forest, Lancetilla Valley near Tela, alt. 20–600 m., Dec. 1927–Mar. 1928, *Standley* 53194, 56850 (F).

COSTA RICA:

GUANACASTE: On tree in wet forest, Los Ayotes, near Tilarán, alt. 600–700 m., Jan. 21, 1926, *Standley & Valerio* 45617 (US). On tree, La Tejona, north of Tilarán, alt. 600–700 m., Jan. 25, 1926, *Standley & Valerio* 45987 (US). On tree in moist forest, Naranjos Agrios, alt. 600–700 m., Jan. 29, 1926, *Standley & Valerio* 46400 (US).

PUNTARENAS: Playa Blanca, Golfo Dulce, Feb. 25, 1933, *Valerio* 561 (F).

LIMÓN: La Salvadora, Reventazón River, near sea-level, April 7, 1928, *Lankester* 1185 (F).

CARTAGO: Forest of San Pedro, near San Ramón, alt. 1,300–1,400 m., April 1913, *Tonduz* 17895 (US).

PANAMA:

COCLÉ: Hills north of El Valle de Antón, trail to La Mesa, alt. ca. 1,000 m., Sept. 2, 1941, *Allen* 2733 (US). Region north of El Valle, alt. 1,000 m., *Allen* 3690 (MO).

CANAL ZONE: Between Frijoles and Monte Lirio, alt. 30 m., Oct. 18, 1922, *Killip* 12144 (US). Barro Colorado Island, 1927, *Kenoyer* 215 (US); June 26, 1931, *L. H. Bailey* 370 (Bailey Hort.); Oct. 26, 1931, *Shattuck* 560 (F); 1931, *Aviles* 13 (F); 1933, *Aviles* 7 (F). Westerly arm of Quebrada Salamanca, alt. 70 m., Dec. 16, 1934, *Dodge, Steyermark, & Allen* 17028 (GH, MO). On branches of tree, near Río Medio, Feb. 11, 1937, *Miller* 1754 (US).

TRINIDAD: On tree, Tamana Forests, Feb. 16, 1915, *Broadway* 7809 (TRIN). Mount Tamana, Mar. 27, 1925, *Broadway* (F).

BRITISH GUIANA:

NORTHWEST DISTRICT: Epiphytic, Mount Everard, Feb. 12, 1922, *Cruz* 1301 in part (GH).

DEMERARA: Epiphytic on *Morabukea*, Moraballi Creek, Essequibo River, ca. latitude 6°11′ N., Sept. 20, 1929, *Sandwith* 310 (K).

VENEZUELA:

ANZOÁTEGUI: On tree, by state of Sucre boundary, vicinity of confluence of Río León with Río Zumbador, northeast of Bergantín, alt. 400–500 m., Feb. 26, 1945, *Steyermark* 61206 (F, GH).

ARAGUA (?): Between Petaquire and the sea, alt. 1,150 m., 1857, *Fendler* 2447 (Goettingen, type of *Tillandsia lineatifolia* Mez).

COLOMBIA:

NORTE DE SANTANDER: Epiphytic, Bellavista on pipeline, alt. 750 m., Sept. 15, 1946, *Foster* 1690 (GH).

EL VALLE: On trees in dense forest, Las Juntas del Dagua, alt. 300–600 m., *Lehmann* K–356 (K). Epiphytic, mangrove swamp, Buenaventura Bay, April 13, 1939, *Killip* 34952 (US).

BRAZIL:

PARÁ: Epiphyte, south forest of the Instituto Agronómico do Norte, Belém, Nov. 16, 1942, *Archer* 7832 (US).

Baker cites this species in the Journal of Botany and in his Handbook but in both instances his descriptions are based on *Tillandsia fasciculata*. Thanks to Mr. N. Y. Sandwith of Kew, I have a photograph of the type of *T. lineatifolia* Mez, which shows beyond doubt that it is a synonym of the earlier *T. anceps*.

19. Tillandsia (Phytarrhiza) **cyanea** Linden ex K. Koch, Wochenschrift **10:** 140. 1867. FIGURE 61

Tillandsia lindeni E. Morr. Belg. Hort. **19:** 321, *pl. 18.* ca. Nov. 1869.
Vriesea lindeni Lem. Ill. Hort. **16:** *pl. 610.* 1869.
Tillandsia morreniana Regel, Gartenflora, **19:** 41. 1870.
Tillandsia coerulea Linden ex K. Koch, Wochenschrift **13:** 197. 1870. Nomen, in synonymy.
Wallisia lindeni E. Morr. Belg. Hort. **20:** 102. 1870. Nomen provisorium.
Tillandsia lindeni vera Dombrain, Floral Mag. **11:** *pl. 44.* 1872.
Tillandsia lindeni var. *genuina* E. Morr. Gard. Chron. II. **12:** 460. 1879.
Phytarrhiza lindeni var. *genuina* E. Morr. Belg. Hort. **29:** 297. 1879.
? Tillandsia lindeni var. *violacea* Hort. ex André, Rev. Hort. **58:** 61. 1886.
Tillandsia lindeniana sensu Mez in DC. Monogr. Phan. **9:** 845. 1896. In part, as to some synonymy, not as to description. Not Regel.
Tillandsia lindeni superba rosea Dauthenay, Rev. Hort. **70:** 539. 1898.
Tillandsia lindeni vera superba Duval, Gartenwelt **5:** 164, *fig.* 1901.

Stemless, scarcely more than 25 cm. high; leaves many, suberect, then recurving, to 35 cm. long, more or less red-striate toward base, finely appressed-lepidote; sheaths elliptic, distinct, 6 cm. long; blades linear-triangular, acuminate, 10–15 mm. wide; scape erect or inclined, very short and almost completely hidden by the leaves; scape-bracts densely imbricate, the lower foliaceous, the upper elliptic, acute; inflorescence simple with several sterile bracts at the base, elliptic, obtuse or broadly acute, strongly complanate, to 16 cm. long and 7 cm. wide, very dense, to 20-flowered; floral bracts elliptic, acute, sharply carinate, exceeding the sepals, coriaceous, even, rose or red, drying to stramineous, obscurely pale-lepidote; sepals free, elliptic, obtuse or broadly acute, 35 mm. long; petal-blades spreading, broadly subrhombic, apiculate, deep violet, 20–25 mm. long; stamens deeply included, exceeding the style.

ILLUSTRATIONS: Rev. Hort. **50:** 390; The Garden **17:** *pl. 215*; Gartenwelt **5:** 164; Floral Mag. **19:** *pl. 385.*

TYPE LOCALITY: "Huancabamba, Peru," described from cultivation. Actually from Zozoranga, Ecuador. Type collected by Wallis.

DISTRIBUTION: Southern Ecuador.

ECUADOR:

CHIMBORAZO: Vicinity of Huigra, Sept. 8, 1918, *Rose* 22617 (NY, US).

AZUAY: Epiphytic, rich rainforest jungle, steep slopes along Río Patul between Hacienda Yubay and Hacienda San José de Caimotán, in region of Sanagüin, alt. 850 m., May 28, 1943, *Steyermark* 52740 (F, GH).

LOJA: Zozoranga, ca. 1866, *Wallis* (no herbarium type, but cf. illustrations in bibliography above).

EL ORO: Between Portovelo (gold mine near Zaruma) and El Tambo, alt. 600–1,000 m., Sept. 2, 1923, *Hitchcock* 21304 (GH, NY, US). Epiphytic, along trail between Portovelo and Río Cabra, passing Minas Nuevas, Huertas, and arriving at Cachicarán, alt. 640–1,645 m., Aug. 23, 1943, *Steyermark* 54095 (F, GH).

FROM CULTIVATION: April 1943, *Missouri Botanical Garden* 158–29–14 (GH). June, 1943, *Barry* (GH).

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FIGURE 61.—*Tillandsia cyanea: a*, Habit, ×1/10; *b*, inflorescence, ×1/2, after E. Morren, Belg. Hort.; *c*, sepal, ×1. *Tillandsia lindeni* (earliest cultivated form): *d*, Habit, ×1/2; *e*, petal, stamens, and pistil, ×1/2, after Regel, Gartenflora.

After a lapse of over 80 years it is still impossible to see any difference between the cultivated material cited above and the specimens that have come directly from their natural habitat.

Dr. Bernice G. Schubert has verified the reference to *Tillandsia cyanea* in Linden's catalog for 1867 in the library at Kew and it is merely a nomen. However, Koch's thumbnail sketch of the species in Wochenschrift of that same year is sufficient to validate the species and show that it has nothing to do with the paniculate *T. cyanea* of E. Morren published in 1879. In describing Linden's exhibit at the Paris horticultural meeting, Koch says: "Als Tillandsia cyanea

fand ich eine Pflanze, welche einen etwas gestielten, aber dicht gedrängten und eiförmigen Blüthenstand von rother (nicht blauer) Farbe besass, vor; . . . ." This in itself is sufficient to effect publication, but elsewhere he refers to "eine Tillandsia mit grossen blauen Blüthen," which is undoubtedly the same plant, since the species has red bracts and blue petals.

19a. Tillandsia cyanea Linden ex K. Koch var. **tricolor** (André) L. B. Smith, comb. nov.

Tillandsia lindeni E. Morr. var. *tricolor* André, Ill. Hort. **24**: 190. 1877.

Spikes broadly oblong, many-flowered; petal-blades blue with a white eye at the base.

TYPE LOCALITY: Along the Río del Cristal between Pisagua and Sabanetas, Los Rios, Ecuador. Type collected by André (No. 4040).

DISTRIBUTION: Southern Ecuador.

ECUADOR:

GUAYAS: Chimbo River Valley, alt. 1,000 m., June 1934, *Rimbach* 199 (F).

LOS RÍOS: Along the Río del Cristal between Pisagua and Sabanetas, latitude 1°40′ S., alt. 200 m., July 11, 1876, *André* 4040 (K, type).

The other so-called varieties of the short-scaped species described under *T. lindeni* Morren are simply more vigorous cultivated forms and hardly worth designation.

20. Tillandsia (Phytarrhiza) **lindeni** Regel, Ind. Sem. Hort. Petrop. for **1868**: 92. Mar. 1869; Ann. Sci. Nat. V. **10**: 382. Ca. Aug. 1869.

FIGURES 61 and 62

Tillandsia lindeniana Regel, Gartenflora **18**: 193, *pl. 619*. 1869.

Tillandsia lindeni E. Morr. var. *regeliana* E. Morr. Belg. Hort. **20**: 225, *pl. 12*. 1870.

Tillandsia lindeni var. *major* Dombrain, Floral Mag. **10**: *pl. 529*. 1871.

?Vriesia violacea Hort. ex Houll. Rev. Hort. **44**: 230. 1872. Nomen, in synonymy.

Tillandsia lindeni var. *rutilans* Linden ex Houll. Rev. Hort. **44**: 230. 1872. Nomen, in synonymy.

Tillandsia lindeni E. Morr. var. *intermedia* E. Morr. ex Carr. Rev. Hort. **50**: 390. 1878.

Phytarrhiza lindeni E. Morr. var. *intermedia* E. Morr. Belg. Hort. **29**: 298. 1879.

Phytarrhiza lindeni E. Morr. var. *regeliana* E. Morr. Belg. Hort. **29**: 298. 1879.

? Tillandsia lindeni var. *violacea* Hort. ex André, Rev. Hort. **58**: 61. 1896.

Tillandsia lindeni vera major Duval, Gartenwelt **5**: 164. 1901.

Stemless, to 8 dm. high; leaves many, 4 dm. long, arching-decurved, more or less striped with red-purple toward the base; sheaths small, elliptic; blades linear-triangular, acuminate, 12–18 mm. wide, covered with minute pale appressed scales beneath, subglabrous above; scape erect, slender, elongate; scape-bracts imbricate, the lower subfoliaceous, the upper elliptic, acute; inflorescence simple, lanceolate or lance-oblong, acute, strongly complanate, dense, up to 20-flowered, up to 20 cm. long and 5 cm. wide, glabrous; floral bracts imbricate,

elliptic, acute, 40–45 mm. long, slightly exceeding the sepals, sharply carinate, subcoriaceous, nerved, green to rose in life; sepals elliptic, obtuse, usually involute, 35 mm. long, ecarinate, coriaceous, nearly even; petal-blades spreading, orbicular, to 4 cm. long, deep blue with a white eye at the base; stamens deeply included, exceeding the pistil.

ILLUSTRATIONS: B. S. Williams, Choice Stove & Greenh. Pl. **2**: 307; ed. 2. **1**: 76: Rev. Hort. **44**: 230; Garden **10**: *pl. 46*; Deutsche Gartenkunst **1880**: 434; Nat. Pflanzenfam. **2**: Abt. 4, 57, *fig. 28A*; ed. 2. **15a**: *fig. 45A*; Bot. Mag. Curtis **96**: *pl. 5850*; Journ. Hort. **43**: 358; Bois, Dict. Hort. *fig. 898*; Gard. Chron. II. **12**: *fig. 72*. 1879; III. **66**: *fig. 136*.

TYPE LOCALITY: "Zazoranga, Ecuador," described from cultivation. Actually from Huancabamba, Peru. Type collected by Wallis.

DISTRIBUTION: Northwestern Peru.

PERU:

PIURA: Huancabamba, ca. 1865, *Wallis* (no herbarium type, but cf. illustrations in bibliography above). Prov. Huancabamba: Epiphytic, Chorro Blanco, 5 km. north of Canchaque, alt. 1,250 m., April 5, 1939, *Stork* 11406 (GH).

The name, "Tillandsia lindeni," sets a new high for confusion in the Bromeliaceae. As used here it applies to the "long-scaped" species first noted by Regel, and not to the "short-scaped" species that E. Morren described as new under the same name. Regel, after publishing his species twice as "lindeni," for no explained reason changed to "lindeniana" for his third and best-known description, and a year later proposed "morreniana" as a new name for Morren's species to avoid duplication of the "lindeni" he now disowned. Morren, not to be outdone in weird reasoning, proceeded to make Regel's earlier species a variety *regeliana* of his, the later, "lindeni."

Regel and Morren argued back and forth in print over the names and status of their two finds and were later further confused by André. Meanwhile, the horticultural writers, struck by the great beauty of the plants, published a profusion of notes and illustrations without stopping to verify names and identities. In several instances they managed to illustrate "lindeni" of Regel while labeling it "lindeni" of Morren.

Regel contented himself in arguing the priority of his name and the specific distinction of the two entities involved. Morren considered them varieties of the same species and went on to add further varieties, still under the wrong "lindeni," with the paradoxical result that three of them must now be transferred from "lindeni" of Morren to "lindeni" of Regel, since the two species were founded independently, and on different types.

Again we meet confusion in the battle of *Tillandsia lindeni*. Both species were collected by Wallis and, as reported by Regel, one came from Zozoranga in Ecuador and the other from Huancabamba in Peru. Morren claimed that they were but a single collection, but

later collections would refute this and also indicate that Regel had reversed species and localities. Actually, all collections since the types indicate that the species with the long scape is Peruvian and that with the short is Ecuadorian.

The earliest specimen of *Tillandsia lindeni* to be illustrated (see fig. 61, *d*) was few-flowered and rather resembled *T. umbellata*, but later more vigorous plants had larger inflorescences (see fig. 62, *a*) that contrast sharply with that species.

FIGURE 62.—*Tillandsia lindeni* (later luxuriant cultivated form): *a*, Inflorescence, ×1/3 after Dombrain, Floral Mag. *Tillandsia umbellata: b*, Habit, ×1/3, after André, Rev. Hort.

The three varieties distinguished from the typical below are all of horticultural origin and one is a hybrid:

Scapes solitary, terminal.
  Spike lanceolate, acute ..... *Tillandsia lindeni*
  Spike elliptic, obtuse ..... a. Var. × *duvali*
Scapes several, terminal and axillary.
  Flowers single ..... b. Var. *luxurians*
  Flowers more or less doubled ..... c. Var. *koutsinskyana*

20a. × Tillandsia lindeni Regel **var. duvali** (Duval ex André) L. B. Smith, comb. nov.

Tillandsia lindeni [E. Morr.] var. × *duvali* Duval ex André, Rev. Hort. **71**: 516. 1899.

× *Tillandsia duvali* Duval in Gartenwelt **5**: 164, *fig.* 1901. Scape solitary, terminal; spike elliptic, obtuse.

DISTRIBUTION: Known only from cultivation.

No material seen. The cross is: ♂ *T. cyanea*×♀ *T. lindeni* and shows the broad blunt spike of *T. cyanea* and the long scape of *T. lindeni.* The original publication of Var. *duvali* does not cite Morren after the species name, "lindeni," but it is obvious that it was so understood from the mention of Var. *regeliana* in the discussion.

20b. Tillandsia lindeni Regel var. **luxurians** (E. Morr.) L. B. Smith, comb. nov.

Tillandsia lindeni E. Morr. var. *luxurians* E. Morr. Belg. Hort. **21**: 289, *pl. 20, 21.* 1871.

Phytarrhiza lindeni var. *luxurians* E. Morr. Belg. Hort. **29**: 299. 1879.

Tillandsia lindeni var. *regeliana* sensu André Ill. Hort. **27**: *pl. 370.* 1880. Not E. Morr.

Tillandsia lindeni splendida Carr. Rev. Hort. **54**: 12, *pl.* 1882.

Tillandsia lindeni sensu Hasack, Möllers Deutsche Gärtn.-Zeit. **15**: 93, *fig.* 1900.

Scapes several, terminal and axillary; spikes lanceolate; flowers single.

ILLUSTRATIONS: Semaine Hort. **4**: *pl. 46.* 1900.

DISTRIBUTION: Known only from cultivation. No material seen.

20c. Tillandsia lindeni Regel var. **koutsinskyana** (E. Morr.) L. B. Smith, comb. nov.

Phytarrhiza lindeni var. *koutsinskyana* E. Morr. Belg. Hort. **30**: 80. 1880.

Scapes several, terminal and axillary; flowers more or less doubled, up to 8 cm. in diameter.

DISTRIBUTION: Known only from cultivation. No material seen.

21. Tillandsia (Phytarrhiza) **umbellata** André, Rev. Hort. **58**: 60, *pl.* 1886.

FIGURE 62

Stemless; leaves spreading-recurving, 25–35 cm. long, exceeding the inflorescence, red-striped beneath toward the base; sheaths small, narrowly elliptic; blades linear-triangular, acuminate, 15 mm. wide at the base, appearing glabrous; scape erect or suberect, slender; scape-bracts closely imbricate, elliptic, acute; inflorescence simple, 4–6-flowered, lanceolate, acute, strongly complanate, 6–7 cm. long exclusive of the petals; floral bracts imbricate, about 4–5 times as long as the internodes, elliptic, acute, carinate, 4 cm. long, equaling or exceeding the sepals, striate, green; flowers all opening at about the same time; sepals free, obtuse, ecarinate; petal-claw linear, white, equaling the sepals, petal-blade obovate, broadly obtuse, 40 mm. long, 25 mm. wide, deep blue with a white eye at the base; stamens deeply included, exceeding the pistil.

TYPE LOCALITY: Between Cisne and Ambocas, Ecuador. Type collected by Poortman (No. 469).

DISTRIBUTION: Known only from the type collection.

ECUADOR:

EL ORO or LOJA: Between Cisne and Ambocas, May 1882, *Poortman* (469) K 317 (K).

The specimen cited above, if not the type, is at least its lineal descendant. The label bears the number "K 317" while André cites "Poortman 469," which indicates that more than one plant may be involved.

22. Tillandsia (Tillandsia) **kegeliana** Mez in DC. Monogr. Phan. **9**: 725. 1896.
FIGURE 63

Stemless; leaves many in a dense rosette, 12–17 cm. long; sheaths broadly ovate, over 3 cm. long, membranaceous, castaneous-lepidote; blades often more or less secund, linear-triangular, involute-subulate,

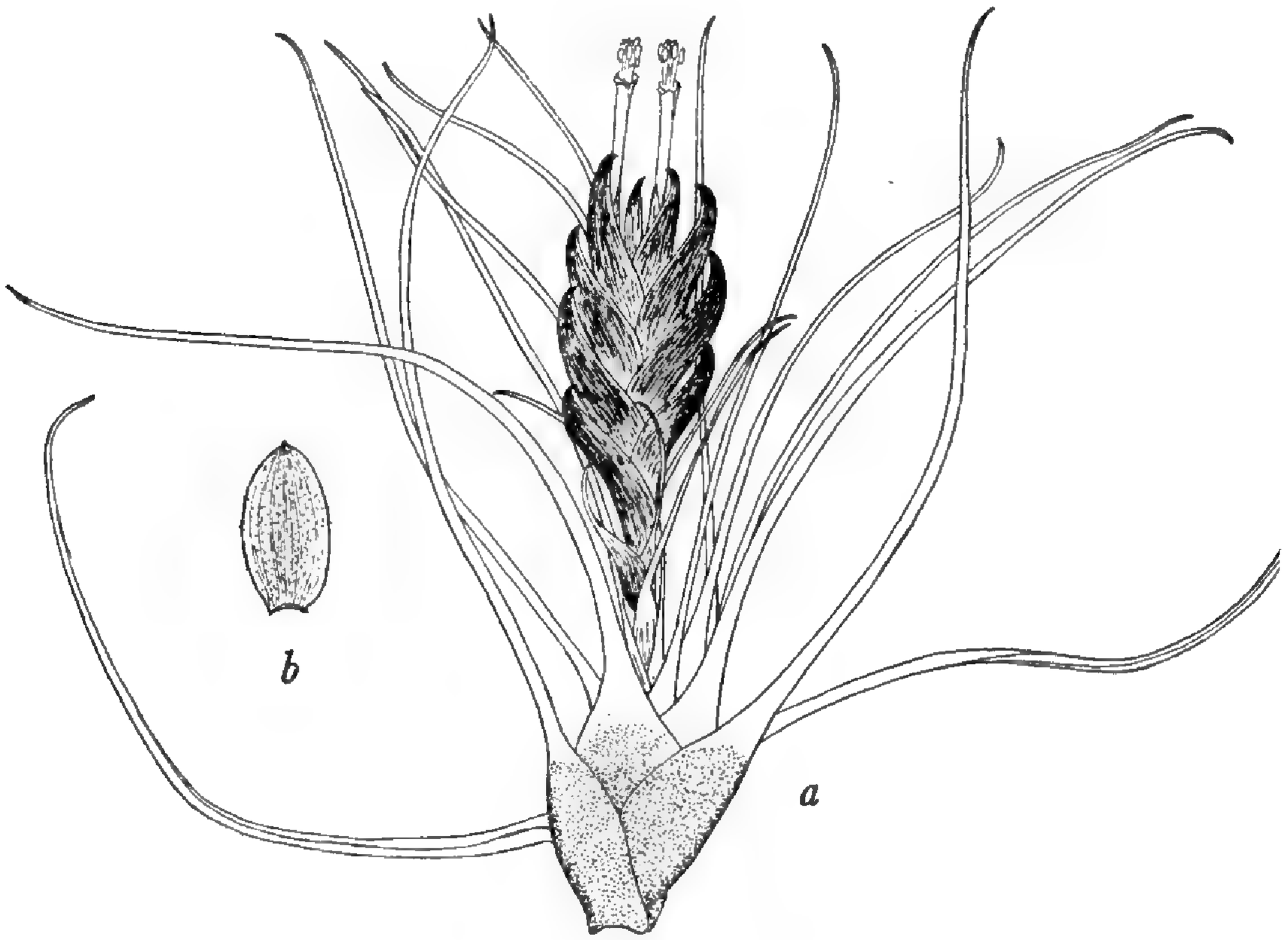

FIGURE 63.—*Tillandsia kegeliana: a*, Habit, ×1/2; *b*, sepal, ×1.

acuminate, 5 mm. wide at the base, rigid, densely pale-lepidote; scape slender, ascending, very short, glabrous; scape-bracts erect, densely imbricate, lance-ovate, long-caudate, appressed-lepidote; inflorescence simple, exceeded by the leaves, densely 6–8-flowered, elliptic, strongly complanate, 40–55 mm. long, 30–35 mm. wide; rhachis undulate, angled, glabrous; floral bracts suberect, densely imbricate, acuminate from a broadly elliptic base, carinate, incurved, 3 cm. long, 16 mm. wide, fleshy, bright red when living, thin, minutely rugulose and blackish when dry, obscurely pale-lepidote to glabrous; flowers erect or suberect; pedicels short and thick; sepals elliptic, obtuse, 2 cm. long, 7.5 mm. wide, coriaceous when dry, probably fleshy when living, densely punctulate-lepidote, slightly nerved, free; petals over 4 cm. long, dark purple; stamens exserted; capsule subprismatic, over 5 cm. long.

ILLUSTRATIONS: Ann. Missouri Bot. Gard. **31**: *fig. 120.*
TYPE LOCALITY: Near Paramaribo, Suriname. Type collected by Kegel.
DISTRIBUTION: Panama, Suriname, Colombia.
PANAMA:
DARIÉN: Forests around Yaviza, southern Darién, April 22, 23, 1914, *H. Pittier* 6583 (US).
SURINAME: on branches of *Crescentia* and *Mangifera*, near Paramaribo, *Kegel* 802, 881; *Splitgerber* 644 (! Mez).
COLOMBIA:
SANTANDER: Epiphytic, Camp Puente, near Barranca Bermeja, Magdalena Valley, between Sogamoso and Colorado Rivers, alt. 100–500 m., Mar. 5, 1935, *Haught* 1587 (GH, US). On trees along ridges, Camp Carare IV, near Puerto Berrio, between Carare and Magdalena Rivers, alt. 100–700 m., May 2, 1935, *Haught* 1689 (US).

The three collections from Suriname were all cited in the original description without selection of the type. The other material has been determined on the basis of Mez's description.

23. Tillandsia (? Tillandsia) **lepidosepala** L. B. Smith, Proc. Amer. Acad. **70**: 155, *pl. 2, fig. 2, 3.* 1935. FIGURE 64

Stemless or very short-caulescent, often aggregated in dense masses; leaves rosulate, up to 15 cm. long, covered with slightly spreading

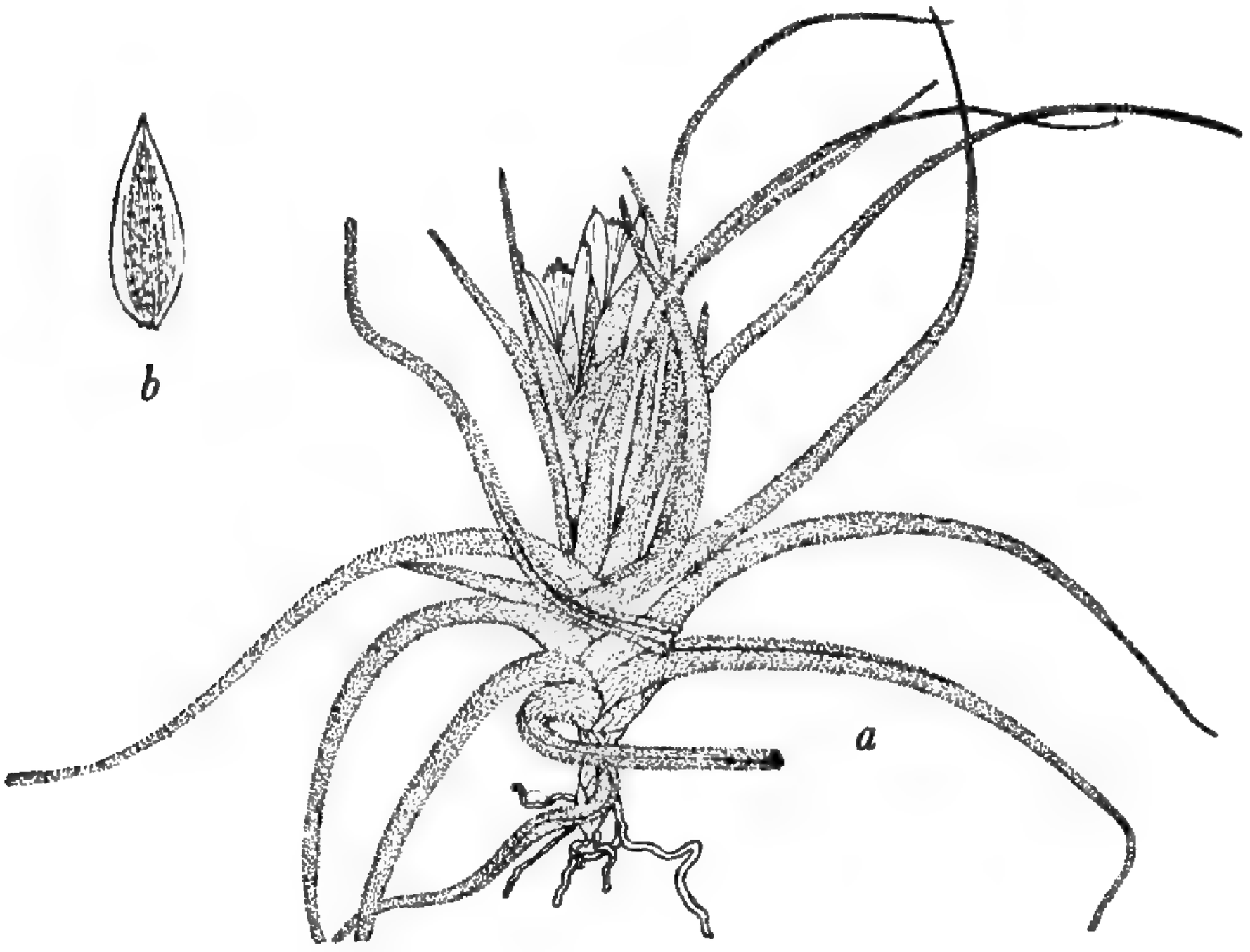

FIGURE 64.—*Tillandsia lepidosepala: a*, Habit, ×1/2; *b*, sepal, ×1.

cinereous scales; sheaths broadly ovate or suborbicular, not at all inflated, 10–15 mm. long; blades erect or spreading, linear-triangular, acuminate, 7 mm. wide at the base, involute; scape short, almost hidden by the leaves; scape-bracts erect, densely imbricate, foliaceous, about equaling the inflorescence; inflorescence simple or rarely with

a small second spike and primary bract like the upper scape-bracts, exceeded by the leaves; spikes 3–5 cm. long, 2–5-flowered, dense, strongly complanate; floral bracts lanceolate, acute, 20–35 mm. long, equaling or exceeding the sepals, three to four times as long as the internodes, submembranaceous, not at all carinate, densely cinereous-lepidote; flowers sessile; sepals lanceolate, acuminate, up to 20 mm. long, strongly nerved, densely lepidote, free, the lateral ones carinate; petals blue (! Foster); capsule cylindric, short-beaked, about equaling the floral bracts.

TYPE LOCALITY: Near Lake Cuitzco, Michoacán, Mexico. Type collected by Pringle (No. 5323).

DISTRIBUTION: Central Mexico.

MEXICO:

HIDALGO: Near Tula, July 3, 4, 1905, *Rose, Painter, & Rose* 8283 (US). On rocks, steep rocky volcanic outcrops at head of descent into Barranca de Metztitlán, between Zoquital and Los Venados, alt. ca. 2,000 m., July 31, 1948, *Moore & Wood* 4221 (US).

PUEBLA: Teocalli de Cholula, near Puebla, alt. 2,224 m., Nov. 7, 1907, *Arsène* 1846 (GH, NY, US). Malinche, near Puebla, 1910, *Nicolas in hb. Arsène* 5742 (US).

MÉXICO or FEDERAL DISTRICT: Valley of Mexico, July 4, 1865, *Bourgeau* 97 (GH).

MÉXICO or MICHOACÁN: Mountains between México and Morelia, May 29, 1849, *Gregg* 1247 (MO, very old, identity uncertain).

MICHOACÁN: On trees near Lake Cuitzco, Aug. 9, 1892, *Pringle* 5323 (GH, type). Indefinite, 1938, *Foster* XV (GH).

24. Tillandsia (Allardtia) **petraea** L. B. Smith, sp. nov. FIGURE 65

Caule ignoto; laminis foliorum quam vaginis castaneis subduplo longioribus, anguste triangularibus, dense cinereo-lepidotis; inflorescentia simplicissima; rhachi excavata; bracteis florigeris distichis, ecarinatis, ad 6 cm. longis, sepala multo superantibus; sepalis liberis, ellipticis, glabris; petalis stamina subaequantibus.

Known only from fragments but probably stemless; leaves erect, densely appressed-lepidote; sheaths elliptic, ample, 7–10 cm. long, dark castaneous; blades narrowly triangular, acuminate, one and a half to two times as long as the sheaths, 3–4 cm. wide at the base; scape erect, 6 mm. thick; scape-bracts erect, densely imbricate, broadly elliptic, apiculate, thin, nerved, appressed-cinereous-lepidote; inflorescence simple, linear, acuminate, complanate, 27 cm. long, 3 cm. wide; rhachis excavated; floral bracts densely imbricate, broadly elliptic, acute, ecarinate, 6 cm. long, thin-coriaceous, rose (! Espinosa), stramineous when dry except for a narrow dark red margin, the lowest lepidote toward the apex; pedicels 5 mm. long; sepals free, elliptic, acute, 3 cm. long, obtusely carinate, glabrous; petals 6 cm. long, about equaling the stamens, green.

Type in the U. S. National Herbarium, No. 1950599, collected on rocks, Chepel, Llanos Payama, northeast of Zaruma, Province of El Oro, Ecuador, altitude 2,950 meters, August 30, 1947, by R. Espinosa (No. E 2002).

DISTRIBUTION: Known only from the type.

ECUADOR:

EL ORO: On rocks, Chepel, Llanos Payama, northeast of Zaruma, alt. 2,950 m., Aug. 30, 1947, *R. Espinosa* E 2002 (US, type).

Because the type lacks a base, *Tillandsia petraea* cannot be classified as caulescent or acaulescent. However, it possesses such ample leaf-sheaths that I feel the probabilities are with the acaulescent character and consequently am including the species here.

If, on the contrary, it proves to be a caulescent plant, then it belongs next to *Tillandsia cauligera* Mez in my treatment in the Proceedings of the American Academy of Arts and Sciences **70**: 162. 1935. It differs from that species in its castaneous leaf-sheaths, large floral bracts, and free sepals.

25. Tillandsia (Anoplophytum) **espinosae** L. B. Smith, sp. nov. FIGURE **65**

Acaulis; foliis multis, utrinque lepidibus minutis cinereis vestitis, vaginis haud inflatis, inconspicuis, laminis lineari-triangularibus; scapo erecto; scapi vaginis imbricatis; inflorescentia simplicissima, complanata; rhachi excavata; bracteis florigeris distichis, paulo imbricatis, sepala multo superantibus, ecarinatis, tenuibus; sepalis symmetricis, liberis, sparse obscureque lepidotis; filamentis plicatis.

Stemless, flowering plant 15–16 cm. high; leaves many, densely rosulate, divergent or spreading in all directions, very densely lepidote throughout with minute cinereous subappressed scales; sheaths broadly ovate, scarcely distinct from the blades; blades rigid, nearly straight, linear-triangular, long-acuminate, pungent, 6–7 mm. broad at the base, involute when dry; scape erect, slender, about equaling the leaves, sparsely appressed-lepidote; scape-bracts erect, densely imbricate, elliptic, obtuse, thin, red, appressed-lepidote; inflorescence simple, linear-lanceolate, complanate, subdense, 6-flowered, 7 cm. long, 8 mm. wide; rhachis slender, slightly flexuous, deeply excavated, sparsely and obscurely lepidote; floral bracts erect, slightly imbricate but concealing very little of the rhachis, oblong-elliptic, obtuse, 25 mm. long, much exceeding the sepals, ecarinate, enfolding the flowers when dry, thin, bright red, sparsely lepidote; pedicels stout, obconic, 3 mm. long; sepals free, elliptic, obtuse, 12 mm. long, ecarinate, thin, very sparsely and obscurely lepidote; petals 30 mm. long, violet; stamens included, filaments plicate toward apex.

Type in the Gray Herbarium, collected at Huaico, Sierra de la Toma, Province of Loja, Ecuador, altitude ca. 1,400 meters, 1947, by R. Espinosa (No. E 1205).

DISTRIBUTION: Known only from the type.

ECUADOR:

LOJA: Epiphytic, Huaico, alt. ca. 1,400 m., 1947, *R. Espinosa* E–1205 (GH, type).

Like *Tillandsia incarnata* H. B. K., this species has plicate filaments, and for that reason I consider it to be a member of the subgenus *Anoplophytum* in spite of its distichous flowers.

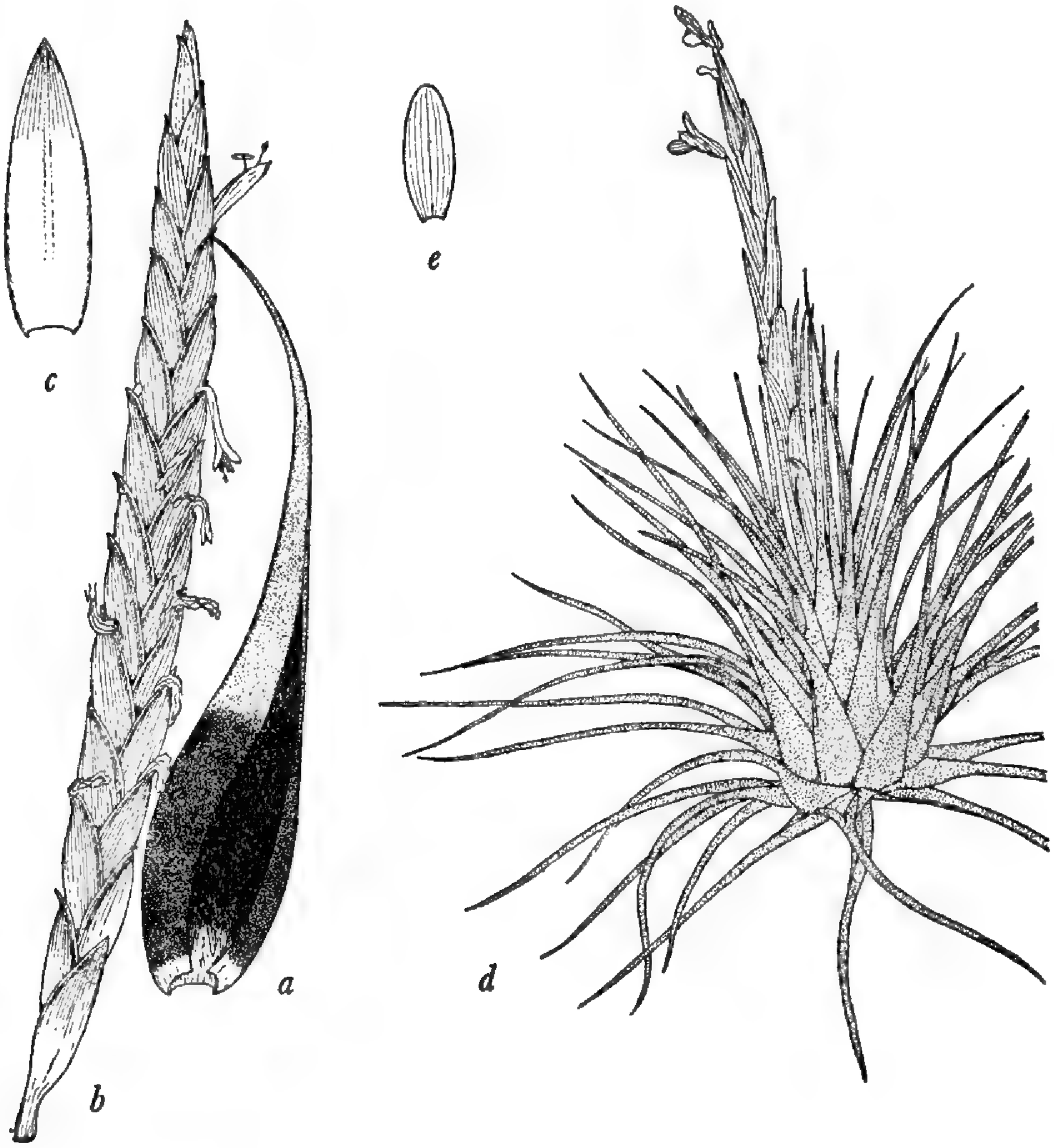

FIGURE 65.—*Tillandsia petraea: a*, Leaf, ×1/3; *b*, inflorescence, ×1/3; *c*, sepal, ×1. *Tillandsia espinosae: d*, Habit, ×1/2; *e*, sepal, ×1.

26. Tillandsia (Tillandsia) **incurva** Griseb. Nachr. Ges. Wis. Goett. for **1864:** 15. 1865. FIGURE 66

Tillandsia dactylifera E. Morr. ex Baker, Handb. Bromel. 181. 1889. (! Mez).

Tillandsia digitata Mez in DC. Monogr. Phan. **9:** 715. 1896.

Tillandsia castaneo-bulbosa Mez & Wercklé, Bull. Herb. Boiss. II. **3:** 140. 1903.

Stemless, 15–40 cm. long with the inflorescence extended; leaves many in a dense subglobose rosette, 15–35 cm. long, very densely and finely appressed-lepidote throughout; sheaths large, distinct,

broadly ovate to suborbicular, dark castaneous; blades triangular, long-acuminate, usually flat, 2–3 cm. wide, cinereous-lepidote; scape arching-decurved, slender, short, much obscured by the leaves,

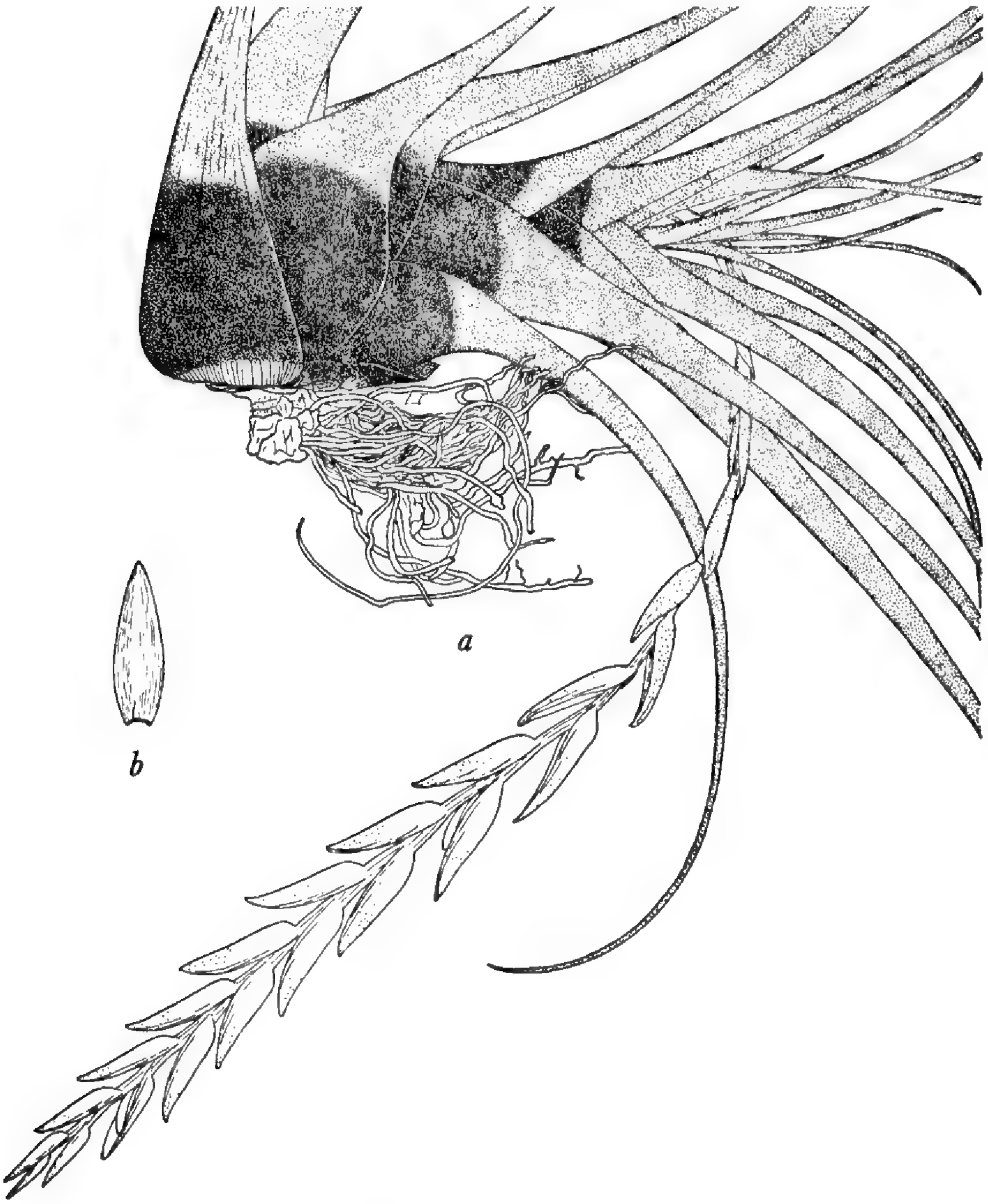

FIGURE 66.—*Tillandsia incurva: a*, Habit, ×1/2; *b*, sepal, ×1.

lepidote at least when young; scape-bracts barely imbricate, tubular-involute, obovate or elliptic, densely appressed-lepidote, at least the lower ones caudate; inflorescence pendulous, simple or digitate with 2–5 spikes; primary bracts like the scape-bracts, scarcely larger than the floral bracts; spikes strict, linear or lance-linear with several sterile bracts at the base, acute, 10–24 cm. long, strongly complanate, 7–16-flowered; rhachis flexuous, slender, strongly angled, lepidote at first; floral bracts erect or slightly divergent, two to three times as long as

the internodes but usually exposing most of the rhachis, elliptic, obtuse, 25–35 mm. long, much exceeding the sepals, ecarinate at maturity, red, submembranaceous, nerved to almost even, appressed-lepidote to glabrous; flowers distinctly pedicellate; sepals elliptic, obtuse or apiculate, 15–20 mm. long, ecarinate, even, soon glabrous, stramineous, thin, free; petals ligulate, 35 mm. long, yellow; stamens exserted at anthesis, anthers linear, 4 mm. long.

TYPE LOCALITY: Near Colonia Tovar, Venezuela. Type collected by Fendler (No. 1524).

DISTRIBUTION: Florida, Greater Antilles, Costa Rica to Venezuela, Bolivia.

UNITED STATES:

FLORIDA:

MONROE COUNTY: On trees, Key West, *Blodgett* (NY).

COSTA RICA: Cultivated, April 1884, *Van Houtte* 6 (Liége, type of *Tillandsia digitata* Mez).

ALAJUELA: La Peña de Zarcero, alt. 1,800 m., April 4, 1938, *A. Smith* H–599 (F, GH).

SAN JOSÉ: On tree, vicinity of Santa María de Dota, alt. 1,500–1,800 m., Dec. 14–26, 1925, *Standley* 41698 (US). On tree in wet forest, Laguna de la Chonta, northeast of Santa María de Dota, alt. 2,000–2,100 m., Dec. 18, 1925, *Standley* 42257 (US). On tree in wet forest, Zurqui, alt. 2,000–2,500 m., Feb. 13, 1926, *Standley & Valerio* 48331, 48338 (US). High in oaks, near Santa María de Dota, alt. 2,400 m., Dec. 15, 1948, *Foster* 2680 (US).

CARTAGO: Forested slopes of Tremendal near San Ramón, alt. 1,300–1,400 m., May 13, 1913, *Tonduz* 17896 (US). On tree, Dulce Nombre, alt. ca. 1,400 m., Feb. 27, 1924, *Standley* 35788 (US). On tree, Las Cóncavas, alt. ca. 1,400 m., Feb. 27, 1924, *Standley* 35977 (US). On tree, La Estrella, Mar. 26, 27, 1924, *Standley* 39533 (US). On tree, vicinity of Orosi, Mar. 30, 1924, *Standley* 39931 (US). On tree, along Río Reventado, north of Cartago, alt. 1,460–1,650 m., Feb. 26, 1926, *Standley & Valerio* 49509, 49575 (US). On tree, El Muñeco, on the Río Navarro, alt. 1,400–1,500 m., Mar. 6, 7, 1926, *Standley & Torres* 51787 (US). Tapantí, alt. 1,300 m., July 15, 1937, *Valerio* 1714 (F). (Las Cóncavas), residence of C. H. Lankester near Cartago, alt. 1,200 m., Dec. 27, 1948, *Foster* 2720 (US).

PANAMA:

CHIRIQUÍ: Epiphytic, vicinity of Finca Lérida, alt. 1750 m., July 7–11, 1940, *Woodson & Schery* 223 (GH).

CUBA:

ORIENTE: Camp La Gloria, south of Sierra Moa, Dec. 24–30, 1910, *Shafer* 8228 (NY). Epiphytic, near Estribo del Pinar, Pico Turquino, Sierra Maestra, alt. ca. 1,900 m., July 23, 1922, *Ekman* 14579 (GH). Epiphytic by the base of large boulders, summit of Loma del Gigante near Río Guisa, Sierra Maestra, Jan. 4, 1923, *Ekman* 16093 (GH). Slopes of Pico Turquino, May 19, 1948, *Acuña* 15063 (Vegas).

HAITI:

L'OUEST: On pine trunks, common, base of Guimbi Galata, Mornes des Commissaires, Oct. 14, 1943, *Holdridge* 1774 (US).

SAN DOMINGO:

SAN JUAN: Epiphyte, hillslopes, near Río Arriba del Norte, north of San Juan, Sept. 9–14, 1946, *Howard* 8938 (GH).

JAMAICA:

SURREY: Cinchona, Blue Mountains, leeward slopes, *Harris & Lawrence* C–15211 (US).

VENEZUELA:

FEDERAL DISTRICT: On tree, mountains near Galipán, Oct. 25, 1921, *E. Pittier* 121 (US). Caracas, mountains near Sanchorquiz, alt., 1,500–1,800 m., *Ernst* (! Mez, type of *Tillandsia dactylifera* E. Morr. ex Baker).

ARAGUA: Near Colonia Tovar, alt. 2,000 m., 1854–55, *Fendler* 1524 (GH, type collection).

BOLÍVAR: On small tree trunk, lower southeastern slopes of Carrao-tepuí, alt. 1,675–1,980 m., Dec. 5, 6, 1944, *Steyermark* 60858 (F, GH).

COLOMBIA:

NORTE DE SANTANDER: Epiphytic, between Ocaña and Convención, alt. 1,200 m., Sept. 20, 1946, *Foster* 1746 (GH).

CUNDINAMARCA: On trees, Paramo de San Miguel, alt. 3,300 m., Oct. 12, 1946, *Foster* 1879 (GH).

CAUCA: On tree trunks, near El Tambo, alt. 1,800 m., April 24, 1934, *Sneidern* 72 (S). In virgin forest, Munchique, near El Tambo, alt. 2,900 m., April 28, 1936, *Sneidern* 665 (S).

BOLIVIA:

LA PAZ: Larecaja: Mapiri region, San Carlos, alt. 850 m., Dec. 2, 1926, *Buchtien* 373 (US).

27. Tillandsia (Tillandsia) **patula** Mez, Repert. Nov. Sp. Fedde **3**: 35. 1906.

FIGURE 67

Stemless, stout, 4 dm. high; leaves many in a subglobose rosette, 2 dm. long, densely lepidote, brownish gray; sheath very broad, ovate-

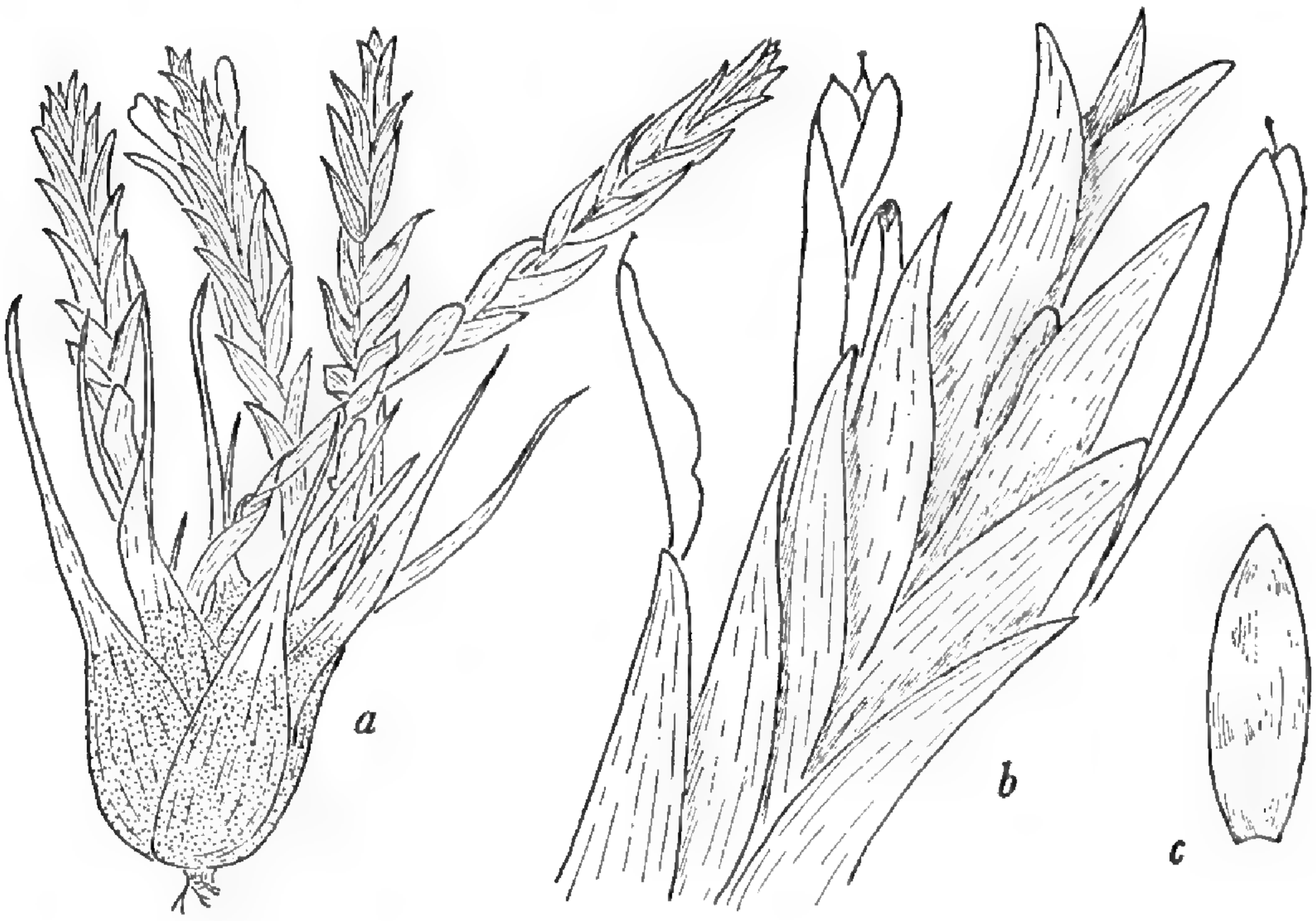

FIGURE 67.—*Tillandsia patula: a*, Habit, ×1/5; *b*, apex of inflorescence, ×1; *c*, sepal, ×1. (Drawn by R. J. Downs.)

triangular, dark brown; blade linear-triangular, long-acuminate, involute-subulate toward the apex, 25 mm. broad at the base, rigid;

scape stout, suberect to decurved, shorter than the leaves; scape-bracts imbricate, elliptic, lepidote, only the lowest laminate; inflorescence simple, erect or pendulous, 16 cm. long, 4 cm. wide; rhachis straight, sharply angled, glabrous; floral bracts imbricate but so narrow as to reveal the rhachis, 45 mm. long, much exceeding the sepals, 12 mm. apart, oblong, obtuse or apiculate, recurved-spreading at the apex, ecarinate, subcoriaceous, glabrous, striate, rose (! Weberbauer); flowers suberect, short-pedicellate, 7 cm. long; sepals free, elliptic, narrowly obtuse, 24 mm. long, nerved, glabrous, ecarinate; petals erect, narrowly obtuse, yellow (! Weberbauer); stamens and pistil exserted.

TYPE LOCALITY: Above Huacapistana on the Palca road, Junin, Peru. Type collected by Weberbauer (No. 2012).

DISTRIBUTION: Vicinity of the type locality.

PERU:

JUNIN: Prov. Tarma, above Huacapistana on the Palca road, alt. 1,900–2,000 m., Jan. 7, 1903, *Weberbauer* 2012 (Berlin, type, Macbride photo No. 11520). Open hillside, Carpapata, above Huacapistana, alt. ca. 2,400 m., June 7, 1929, *Killip & Smith* 24349 (US). Common, crevices of sandstone cliff, between Palca and Carpapata, alt. 2,900 m., Mar. 18, 1939, *Stork* 10963 (F).

28. Tillandsia (Tillandsia) **pueblensis** L. B. Smith, Contr. Gray Herb. **104**: 81, *pl.* **3**, *figs. 1, 2.* 1934. FIGURE 68

Stemless, 16–24 cm. high; leaves rosulate, densely pruinose-gray-lepidote, the outer reduced to pointed sheaths, the inner up to 16 cm. long, often recurved; sheaths scarcely distinct; blades narrowly triangular, about 10 mm. wide at the base, involute, pungent; scape erect, short; lower scape-bracts foliaceous, long-laminate, the upper ones lanceolate, acute, membranaceous, appressed-lepidote; inflorescence simple, linear-lanceolate, laxly 5–7-flowered, up to 9 cm. long, 1 cm. broad; floral bracts erect, narrowly lanceolate, acute, ecarinate, imbricate but not always concealing the rhachis, 25–40 mm. long, membranaceous, strongly nerved, appressed-gray-lepidote, bright rose; flowers subsessile; sepals narrowly lanceolate, acute, 20 mm. long, membranaceous, nerved, carinate, glabrous, the posterior ones connate for 6 mm.; petals violet, 4 cm. long, tubular-convolute; stamens and pistil exserted.

TYPE LOCALITY: Zapotitlán, Puebla, Mexico. Type collected by Purpus (No. 5856).

DISTRIBUTION: Mexico.

MEXICO:

PUEBLA: Tehuacán, Mar. 1904, *Trelease* 130/04/17 (MO). Zapotitlán, April 1912, *Purpus* 5856 (GH, type; BM, F, MO, NY, UC, US).

OAXACA: Oaxaca, May 20, 1906, *Pringle* 13856 (US), 13857 (GH, US).

29. Tillandsia (Tillandsia) **achyrostachys** E. Morr. ex Baker, Handb. Bromel. 171. 1889. FIGURE 68

Stemless, 2–4 dm. high; leaves densely rosulate, 20–27 cm. long, very densely and finely appressed-cinereous-lepidote throughout; sheaths erect, subtriangular, elongate, merging insensibly into the blade; blades usually curved-spreading, very narrowly triangular, filiform-acuminate, 1 cm. wide, flat; scape erect; scape-bracts densely imbricate, the lower foliaceous, the upper broadly elliptic, filiform-caudate or apiculate, chartaceous, densely lepidote; inflorescence

FIGURE 68.—*Tillandsia pueblensis: a*, Habit, ×1/4; *b*, posterior sepals, ×1, after L. B. Smith, Contr. Gray Herb. *Tillandsia achyrostachys: c*, Habit, ×1/4; *d*, posterior sepals, ×1. *Tillandsia achyrostachys* var. *stenolepis: e*, Inflorescence, ×1/2.

simple, densely distichous-flowered or sometimes the lower flowers polystichous (! Mez), linear, acute, 1–2 dm. long, terete or subterete at anthesis, 8–15 mm. in diameter, glabrous; floral bracts erect, densely imbricate, ovate, acute, 3–4 cm. long, exceeding the sepals, three to four times as long as the internodes, ecarinate, chartaceous, closely and strongly nerved, bright red; flowers sessile; sepals lanceolate, acuminate, up to 26 mm. long, carinate, membranaceous, prominently nerved, short-connate posteriorly; petals erect, 45 mm. long, ligulate, obtuse, yellow; stamens and pistil exserted; capsule slenderly ellipsoid, abruptly short-beaked, barely exceeding the sepals.

TYPE LOCALITY: "Mexico." Described from cultivation.

DISTRIBUTION: Central to southern Mexico.

MEXICO: Morren drawing made April 1881 from a plant received from Kienast of Zurich (K, type).

PUEBLA: Izucar de Matamoros, Dec. 1884, *Com. Geogr. Explor. Rep. Mex.* 372 (F, GH). Mountains, near Tehuacán, Dec. 1895, *Pringle* 7025 (US).

MORELOS: Yautepec, Aug. 27, 1903, *Rose & Painter* 719 (US). Near Cuernavaca, Sept. 9, 1903, *Rose & Painter* 8070 (US). Canyon del Lobo, alt. 1,800 m., Jan. 15, 1932, *Fröderström & Hultén* 160 (NY, S).

OAXACA: Cerro de San Felipe, Jan. 15, 1899, *Conzatti & Gonzales* 947 (GH). Lachatao, Oaxaca, Dec. 24, 1947, *MacDougall* (US).

29a. Tillandsia achyrostachys E. Morr. ex Baker var. **stenolepis** L. B. Smith, var. nov. FIGURE 68

Differt bracteis florigeris angustioribus.

Floral bracts narrow, not altogether concealing the rhachis, not over 3 cm. long.

Type in the U. S. National Herbarium, No. 934346, collected on burseras, hills near Guadalajara, Jalisco, Mexico, June 25, 1892, by C. G. Pringle (No. 4111).

DISTRIBUTION: Northern to central Mexico.

MEXICO: Barrancas, May 25, 1849, *Gregg* 896 (MO).

CHIHUAHUA: Candemeña River, Río Mayo headwaters, June 23, 1937, *LeSeur* 1288 (F, GH, MO).

DURANGO: Epiphytic, Corral de Piedra on Río Piaxtla, alt. 1,200 m., April 10, 1943, *Lundell* 13007 (GH, Lundell). Ojito, above Corral de Piedra on Río Piaxtla, alt. 1,500 m., April 12, 1943, *Lundell* 13011 (Lundell).

NAYARIT: Hills west of Ahuacatlán ("Agua Catlan"), May 25, 1849, *Gregg* 995 in part (MO).

JALISCO: Bluffs of barranca, near Guadalajara, Sept. 28, 1891, *Pringle* 5170 (GH). On *Bursera*, hills near Guadalajara, June 25, 1892, *Pringle* 4111 (US, type: F, GH, MO, NY). Between Bolaños and Guadalajara, Sept. 19, 1897, *Rose* 3022 (US). Epiphytic, barranca near shrine, southeast of Ciudad Guzman, Oct. 23, 1940, *Moore* 173 (GH).

GUANAJUATO: Mountains of Santa Rosa, 1901, *Duges* (GH).

MICHOACÁN: Epiphytic, dry roadside, about 70 km. from Temascal on road to Huetamo, Nov. 13, 1949, *Moore, Hernandez, & Porras* 5683 (Bailey Hort.).

OAXACA: Between Totolapa and San Carlos, alt. 900–1,140 m., April 19, 20, 1895, *Nelson* 2545 (US).

30. Tillandsia (Phytarrhiza) **triglochinoides** Presl, Rel. Haenk. **1:** 125. 1827. FIGURE 69

Tillandsia hartwegiana Brongn. ex Baker, Handb. Bromel. 171. 1889. Nomen, in synonymy.

Stemless, to 3 dm. high; leaves few in a lax rosette, 2 dm. long, appressed-lepidote; sheaths hardly distinct; blades linear-triangular, long-acuminate, subpungent, rigid, 7 mm. broad, cinereous or yellowish; scape slender, erect, shorter than the leaves; scape-bracts tubular-erect, imbricate and wholly concealing the scape, sublanceolate, acute, lepidote toward the apex; inflorescence simple, rather lax, very narrowly lanceolate or linear, acute, strongly complanate, ca. 13 cm. long, 8 mm. wide, about 22-flowered; rhachis slightly but distinctly

undulate, not much thickened at the base of the flowers; floral bracts erect or suberect, scarcely or not all all imbricate, about 7 mm. apart, triangular-ovate, ecarinate, 19 mm. long, 8 mm. wide, enfolding and exceeding the sepals, submembranaceous, prominently nerved, glabrous; flowers subsessile; sepals equally very short-connate, lance-ovate, acute, to 12 mm. long, scarcely carinate, coriaceous, nearly even, lustrous; petals about 9 mm. longer than the sepals, claw linear, blade broadly lanceolate, acute, reflexed at anthesis, yellow (! Hartweg); stamens deeply included.

TYPE LOCALITY: Guayaquil, Ecuador. Type collected by Haenke.
DISTRIBUTION: Southern Ecuador.
ECUADOR:
GUAYAS: Guayaquil, 1790–91, *Haenke* (Prague, type). In woods near Zamborondón, Mar. 1842 (?), *Hartweg* 699 (K; Vienna, Macbride photo No. 29986).
EL ORO: On tree along river, Portovelo (gold mine near Zaruma), alt. 600–1,000 m., Aug. 30–Sept. 1, 1923, *Hitchcock* 21219 (GH, NY, US); on tree, dry hill, *Hitchcock* 21246 (GH, NY, US).

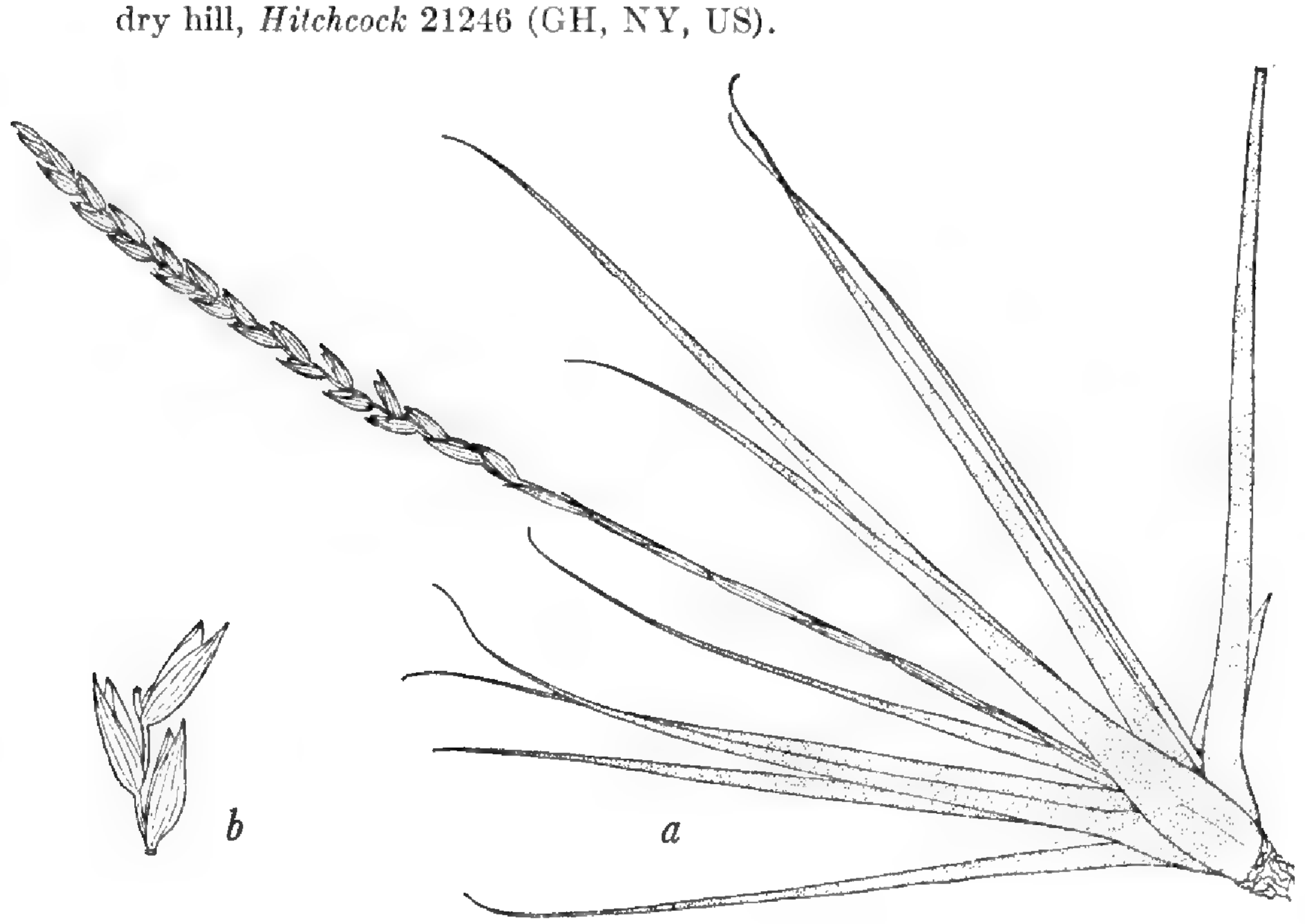

FIGURE 69.—*Tillandsia triglochinoides: a*, Habit, ×1/2; *b*, section of inflorescence, ×1.

31. Tillandsia (Tillandsia) **argentea** Griseb. Cat. Pl. Cub. 254. 1866.

FIGURE 70

Plant 25 cm. high; stem curved, very short but often branched; leaves many in a dense rosette, spreading, 6–9 cm. long, densely covered with white or ferruginous appressed to slightly spreading scales; sheaths subtriangular, small, scarcely distinct from the blade; blades linear-subulate, filiform-acuminate, rigid, 1–2 mm. wide at the base; scape erect or ascending, exceeding the leaves, 1 mm. in

diameter, bright red, glabrous; scape-bracts erect, partially clasping the scape, exceeding the internodes or the uppermost sometimes slightly shorter, ovate, abruptly acute or caudate, 8 mm. long without the caudate apex, chartaceous, prominently nerved, bright red, at least the lowest densely appressed-lepidote; inflorescence simple, 7 cm. long, lax, up to 6-flowered with the rudiment of a seventh at the apex; rhachis geniculate, slender, angled, glabrous; floral bracts equaling or shorter than the internodes, broadly elliptic, acute or apiculate, 11 mm. long, much shorter than the sepals, membranaceous, densely appressed-lepidote; flowers subspreading; pedicels distinct, stout, 2–5 mm. long; sepals elliptic, obtuse, 14 mm. long, 5 mm. wide, submembranaceous, prominently nerved, appressed-lepidote, becoming glabrous with age, free; petals ligulate, obtuse, 3 cm. long, bright red or purple; stamens exserted, shorter than the pistil; capsule 4–5 cm. long, slender, acute.

TYPE LOCALITY: near Monteverde, Oriente, Cuba. Type collected by Charles Wright.

DISTRIBUTION: Mexico, Guatemala, Cuba, Jamaica.

MEXICO:

SINALOA: Foothills of the Sierra Madre, near Colomas, *Rose* 1708 (US).

GUERRERO: Mina District: On cliff, I. R. F. del Oro, Trincheras, May 2, 1937, *Hinton et al.* 10126 (GH).

OAXACA: Between San Carlos and San Bartolo, alt. 900–1,440 m., April 21, 1895, *Nelson* 2561 (US).

CHIAPAS: Mount Ovando, Feb. 1939, *Matuda* 2642 (NY). La Grandeza, alt. 2,016 m., May 19, 1945, *Matuda* 5605 (GH).

GUATEMALA:

QUICHÉ: Abundant, on tree, dry rolling hills with pine and oak forest, between Quiché and San Pedro Jocopilas, alt. 1,800–2,100 m., Jan. 12, 1939, *Standley* 62454 (F, GH).

HUEHUETENANGO: On tree, often in dense clumps, along road 13 km. west of Huehuetenango, near Puente de Xinxó, alt. ca. 1,800 m., Dec. 30, 1940, *Standley* 81485 (GH).

SAN MARCOS: Finca El Porvenir, on Potrero Matasán along Río Cabús, Volcán Tajumulco, alt. 1,000–1,300 m., Mar. 12, 1940, *Steyermark* 37637 (F, GH).

QUEZALTENANGO: On tree in dense forest, along old road between Finca Pirineos and Patzulín, alt. 1,200–1,400 m., Feb. 9, 1941, *Standley* 86983 (GH).

SUCHITEPÉQUEZ: Upper slopes of barranco, lower slopes of Volcán Zunil, near Finca Montecristo, southeast of Santa María de Jesús, alt. 1,200–1,300 m., Jan. 31, 1940, *Steyermark* 35214 (F, GH).

CUBA:

ORIENTE: Near Monte Verde, 1859, *C. Wright* No. a (GH, type collection). On tree in woodlands, near El Cuero, alt. 330 m., Mar. 18, 19, 1912, *Britton & Cowell* 12744 (NY). Epiphytic, by Río Potrerillo, El Dean, Costa Sur, Niquen, July 30, 1935, *Roig, Acuña, & Baker* 6571 (NY, Vegas).

JAMAICA: *Wolle* (GH).

FIGURE 70.—*Tillandsia argentea: a*, Habit, ×1/2; *b*, sepal, ×1. *Tillandsia karwinskyana: c*, Leaf, ×1/2; *d*, inflorescence, ×1/2; *e*, sepal, ×1; *f*, petal, ×1.

32. Tillandsia (Tillandsia) **karwinskyana** Schult. in Roem. & Schult. Syst. Veg. **7:** 1209. 1830. FIGURE 70

Tillandsia pringlei S. Wats. Proc. Amer. Acad. **26:** 155. 1891.

Stemless, 4–6 dm. high; leaves in a dense fasciculate rosette, 15–20 cm. long, densely and persistently lepidote throughout with coarse

spreading to appressed scales; sheaths ovate or triangular, small, sometimes castaneous; blades linear-triangular, acuminate, 1 cm. wide at the base, cinereous-lepidote; scape erect, 2–3 mm. in diameter, equaling or exceeding the leaves, glabrous; scape-bracts erect, involute, appressed-cinereous-lepidote, the lower foliaceous, densely imbricate, the upper elliptic, acute or apiculate, submembranaceous, bright red, barely exceeding the internodes; inflorescence simple or few-branched; primary bracts like the upper scape-bracts, not attaining the lowest flower of the axillary spikes; spikes suberect, linear, laxly 4–8-flowered, 10–15 cm. long, long-stipitate with a single sterile bract at the base; rhachis flexuous, angled, sulcate, glabrous; floral bracts erect, ovate, acute, 15–20 mm. long, much shorter than the sepals, glabrous or sparsely lepidote, prominently nerved, submembranaceous with a thinner often blackish margin; flowers strict, appressed to the rhachis; pedicels very short and stout; sepals elliptic, obtuse, 23 mm. long, glabrous, prominently nerved, submembranaceous, short-connate; petals erect, linear, 35 mm. long, greenish yellow; stamens exserted, the filaments undulate when dry.

TYPE LOCALITY: "Mexico." Type collected by Karwinski.

DISTRIBUTION: Northeastern Mexico.

MEXICO: *Karwinski* (M, type); June 20, 1936, *Foster* 1160 (GH).

NUEVO LEÓN: Common over small areas on limestone cliffs facing west, Sierra Madre Oriental, Canyon Santa Ana to Alamar, about 15 miles southwest of Galeana, July 2, 1934, *Mueller* 960 (GH).

SAN LUIS POTOSÍ: Las Palmas, June 4, 1890, *Pringle* 3530 (GH, type of *Tillandsia pringlei* S. Wats.). On rocks and trees, Las Canoas, June 10, 1891, *Pringle* 3738 (F, GH, MO, NY, US). On rocks, Sierra de Guascama, Minas de San Rafael, June, 1911, *Purpus* 5367 (F, GH, NY).

HIDALGO: On limestone boulders, dry pine-oak woods, Puerto de la Zorra, near Km. 284 on highway northeast of Jacala, alt., 1,500 m., Oct. 27, 1946, *Moore* 1682 (US); April 27, 1947, *Moore* 2658 (US). On shrub, thickets between Hilo Juanico and Barranca Seca on trail from Jacala to Pacula, alt. 1,400–1,600 m., July 9, 1948, *Moore & Wood* 3841 (US).

PUEBLA: Near Tehuacán, Aug.–Sept. 1905, *Rose, Painter, & Rose* 9972 (US).

Baker's descriptions of this species in the Gardeners, Chronicle, in the Journal of Botany, and in his Handbook, are all based on a single collection by Sargent and speak of the leaves as glabrous on one side and thinly lepidote on the other. Thus it seems very doubtful that he had *Tillandsia karwinskyana.*

33. Tillandsia (Phytarrhiza) **monadelpha** (E. Morr.) Baker, Journ. Bot. Brit. & For. **25:** 281. 1887. FIGURE 71

Phytarrhiza monadelpha E. Morr., Belg. Hort. **32:** 168, *pl. 7.* 1882.

Tillandsia graminifolia Baker, Journ. Bot. Brit. & For. **25:** 281. 1887.

Catopsis (*Andrea*) *alba* E. Morr. ex Baker, Handb. Bromel. 192. 1889. Nomen, in synonymy.

Tillandsia monobotrya Mez, Repert. Sp. Nov. Fedde **16:** 77. 1919.

Tillandsia digitata sensu Standl., Smithsonian Misc. Coll. **78:** No. 8:12. 1927. Non Mez.

Stemless, flowering plant 35 cm. high; leaves densely rosulate, 2 dm. long, obscurely punctulate-lepidote; sheaths ovate; blades very narrowly triangular, 10–15 mm. wide; scape erect, soon becoming lateral, slender, glabrous; scape-bracts lance-elliptic, imbricate, lepidote at the apex; inflorescence simple, linear-oblong, much compressed, about 22-flowered, appearing lax by the spreading of the flowers, 13

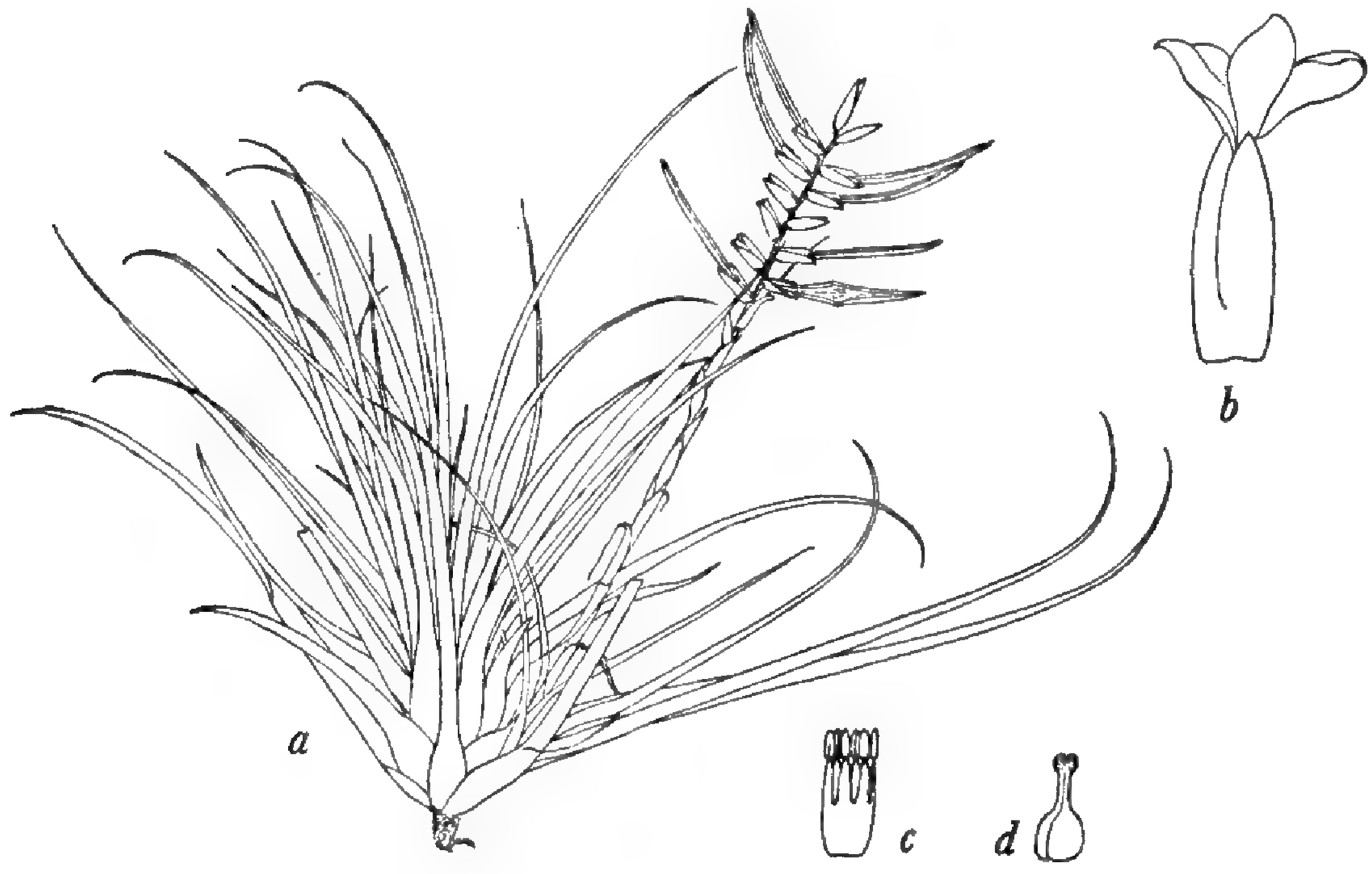

FIGURE 71.—*Tillandsia monadelpha: a*, Habit, ×1/4; *b*, flower, ×1; *c*, stamens ×1; *d*, pistil ×1, details after E. Morren, Belg. Hort.

cm. long; rhachis straight, alate-angled; floral bracts ovate, acute, 17 mm. long, equaling the sepals, coriaceous or subcoriaceous, carinate, striate, sparsely lepidote, soon glabrous; flowers sessile, spreading, 30 mm. long; sepals equally short-connate, glabrous, lance-elliptic, carinate; petals white or yellow (! Schipp), the blades ovate, reflexed; stamens deeply included, exceeding the style, filaments connate; capsule slenderly cylindric, 4–7 cm. long.

ILLUSTRATIONS: Ann. Missouri Bot. Gard. **31**: *fig. 108;* Publ. Carnegie Inst. Washington 522: *fig. 7.*

TYPE LOCALITY: South America. Described from cultivation.

DISTRIBUTION: Central America, Trinidad, northern South America.

GUATEMALA:

ALTA VERAPAZ: Finca Tres Aguas, alt. 300 m., April 16, 1907, *Goll* 117 (US).

IZABAL: On tree, wet forest near Entre Ríos, alt. ca. 18 m., April 30, 1939. *Standley* 72747 (F). Epiphytic, Río Dulce, between Livingston and 6 miles up river on north side, alt. 1–25 m., April 14, 1940, *Steyermark* 39373 (F). Epiphytic, along Río Dulce below junction with Río Tameja, Dec. 28, 1941, *Steyermark* 42017 (F, GH).

BRITISH HONDURAS:

STANN CREEK DISTRICT: Occasional, epiphytic in dense forest, Middlesex, alt. 60 m., Sept. 26, 1929, *Schipp* 390 (F, GH, MICH, MO). On tree in high ridge, Stann Creek Valley, Antelope Ridge, Feb. 1940, *Gentle* 3193 (GH, NY).

HONDURAS:

ATLÁNTIDA: On tree, Lancetilla Valley near Tela, alt. 20–600 m., Dec. 1927–Mar. 1928, *Standley* 53195 (F); 53386, 53503 (F, US); 53959, 54193 (F); 54811 (F, GH, US); 55625 (F); alt. 450 m., June–July, 1929, *Chickering* 99 (MICH); 124 (F, MICH); alt. 150 m., July 24, 1934, *Yuncker* 5089 (F, MICH, MO).

COSTA RICA:

GUANACASTE: On tree, El Silencio near Tilarán, alt. ca. 750 m., Jan. 13, 1926, *Standley & Valerio* 44783 (US). On tree, El Arenal, alt. 485–600 m., Jan. 18, 19, 1926, *Standley & Valerio* 45123 (US). On tree, Los Ayotes near Tilarán, alt. 600–700 m., Jan. 21, 1926, *Standley & Valerio* 45601, 45611, 45626 (US). On tree in moist forest, La Tejona, north of Tilarán, alt. 600–700 m., Jan. 25, 1926, *Standley & Valerio* 46031 (US). On tree in moist forest, Quebrada Serena, southeast of Tilarán, alt. ca. 700 m., Jan. 27, 1926, *Standley & Valerio* 46263 (US).

LIMÓN: On tree, La Colombiana Farm of the United Fruit Co., alt. ca. 70 m., Mar. 6, 7, 1924, *Standley* 36827, 37310 (US). On tree in wet forest, Finca Montecristo, on the Río Reventazón below Cairo, alt. ca. 25 m., Feb. 18, 19, 1926, *Standley & Valerio* 48946, 48993 (US). Forest near farmhouse at Finca Castilla, alt. 30 m., July 23–29, 1936, *Dodge & Goerger* 9269 (GH, MO).

LIMON or CARTAGO (?): Baguar, alt. 45 m., June 17, 1874, *Kuntze* 2009 (NY).

CARTAGO: Azul, Turrialba, alt. 650 m., Mar. 1908, *Wercklé* 150, *in hb. Mus. Nac. Costa Rica* 17444 (Berlin, type of *Tillandsia monobotrya* Mez, Macbride photo No. 11513). On tree, near Pejivalle, alt. ca. 900 m., Feb. 7, 8, 1926, *Standley & Valerio* 47236 (US). Epiphytic (Las Cóncavas) residence of C. H. Lankester, near Cartago, alt. 1,200 m., Dec. 17, 1948, *Foster* 2700 (US).

PANAMA:

COCLÉ: El Valle de Antón, alt. 1,000 m., June 5, 1939, *Alston* 8795 (BM). Epiphytic, north of El Valle de Antón, near La Mesa, alt. ca. 1,000 m., Nov. 12, 1941, *Allen* 2782 (GH).

CANAL ZONE: Hills around the Agua Clara Reservoir, near Gatún, alt. 20–30 m., Feb. 5, 1911, *H. Pittier* 2658 (US). Wet forest, Barro Colorado Island, Gatún Lake, alt. ca. 120 m., Nov. 1925, *Standley* 41169 (US); Aug. 15, 1927, *Kenoyer* 214 (US); Nov. 2, 1931, *Shattuck* 552 (F). Westerly arm of Quebrada Salamanca, alt. 75 m., Dec. 16, 1934, *Dodge, Steyermark, & Allen* 17024 (GH, MO).

DARIÉN: Cana-Cuasi Trail (Camp 2), Chepigana District, alt. 600 m., Mar. 13, 1940, *Terry* 1546 (F).

TRINIDAD: *Fendler* 828 (! Baker); *Broadway* 2807 (! Mez). Chaguanas, May 1868, *Finlay* 2004 (NY, TRIN); April 1889, *Broadway* 3741 (TRIN). Arima, 1906, *Dannouse* (TRIN). On tree, Tamana forests, Feb. 16, 1915, *Broadway* 7808 (TRIN); April 27, 1915, *Broadway* 7818 (TRIN). Forest near Tabaquite, Mar. 26–28, 1921, *Britton, Freeman, & Nowell* 2574 (NY).

FRENCH GUIANA: 1842, *Melinon* 134 (P). Karduany, 1855, *Sagot* 859 (P).

BRITISH GUIANA:

NORTHWEST DISTRICT: Short cut, Waini River, July 1906, *Becket* 8521 (Jenman, NY, US). Epiphytic, Mount Everard, Feb. 12, 1922, *Cruz* 1301 in part (NY). Amakura River, latitude 8°10′ N., longitude 60° W., Mar. 23–30, 1923, *Cruz* 3562 (F, GH, MO, NY, US). On overhanging tree along Amakura River, Yarikita Police Station, junction of Yarikita and Amakura Rivers, Jan. 17, 18, 1920, *Hitchcock* 17636 (GH).

ESSEQUEBO: Epiphytic, Essequebo River, Moraballi Creek, near Bartica. near sea-level, Aug. 21, 1929, *Sandwith* 79 (NY).

RUPUNUNI DISTRICT: Epiphytic, upper Rupununi River, near Dadanawa, latitude 2°45′ N., June 16, 1922, *Cruz* 1539 (GH, NY, US).

COLOMBIA:

EL VALLE: Epiphytic, forest, Santa Rosa, Dagua Valley, alt. 200–300 m., Sept. 22, 1922, *Killip* 11532 (GH, NY, US). Epiphytic, woods, Río Cajambre, Pacific coast, alt. 5–80 m., May 5–15, 1944, *Cuatrecasas* 17465 (GH). Epiphytic, dense forest, Agua Clara, along highway from Buenaventura to Cali, alt. ca. 100 m., June 6, 1944, *Killip & Cuatrecasas* 38879 (GH, US).

CAUCA: Timbiquí, *Lehmann* 8637 (F).

NARIÑO: Epiphytic, dense forest along stream, east side of Gorgona Island, alt. 50–100 m., Feb. 11, 1939, *Killip & Garcia* 33182 (GH, US).

ECUADOR: *Eggers* 15252 (K). Puente de Chimbo, alt. 300–1,000 m., *Lehmann* 5303 (F).

FROM CULTIVATION: June 15, 1875, *Hort. Linden* (Liége, probable basis of drawing at Kew that is the type of *Catopsis* (*Andrea*) *alba* E. Morr. ex Baker).

The type of *Tillandsia monadelpha* is a cultivated plant from Linden. Very likely it is the same plant that is the type of *Catopsis alba*.

34. Tillandsia (Phytarrhiza) **narthecioides** Presl. Rel. Haenk. **1:** 125. 1827.

FIGURE 72

Stemless or very short-caulescent, about 45 cm. high; leaves 20–30 in a dense rosette, all or nearly all erect, 20–40 cm. long; sheaths elongate, scarcely distinct, covered with a ferruginous membrane of appressed scales; blades long-acuminate, 5 mm. wide or less, sparsely and minutely lepidote beneath, subchartaceous when dry; scape very slender, erect, much shorter than the leaves; scape-bracts tubular-involute, erect, the lower imbricate, the upper elliptic, obtuse, 15 mm. long, equaling the internodes, purple (! Camp); inflorescence simple, lax, linear, to 30-flowered, 12 cm. long, 25 mm. wide; rhachis completely exposed, glabrous, regularly undulate especially toward the apex, not at all thickened at the bases of the flowers, internodes ca. 6 mm. long; floral bracts spreading, linear-elliptic, obtuse, ca. 13 mm. long, equaling the sepals, 3.5–4 mm. wide, scarcely carinate, glabrous outside, prominently nerved, chartaceous; flowers sessile; sepals equally subfree, elliptic, obtuse, coriaceous, glabrous, prominently nerved; petals white, the blades spreading, 6 mm. long; stamens deeply included, exceeding the pistil, filaments high-connate; capsule slenderly cylindric, acute, to 36 mm. long.

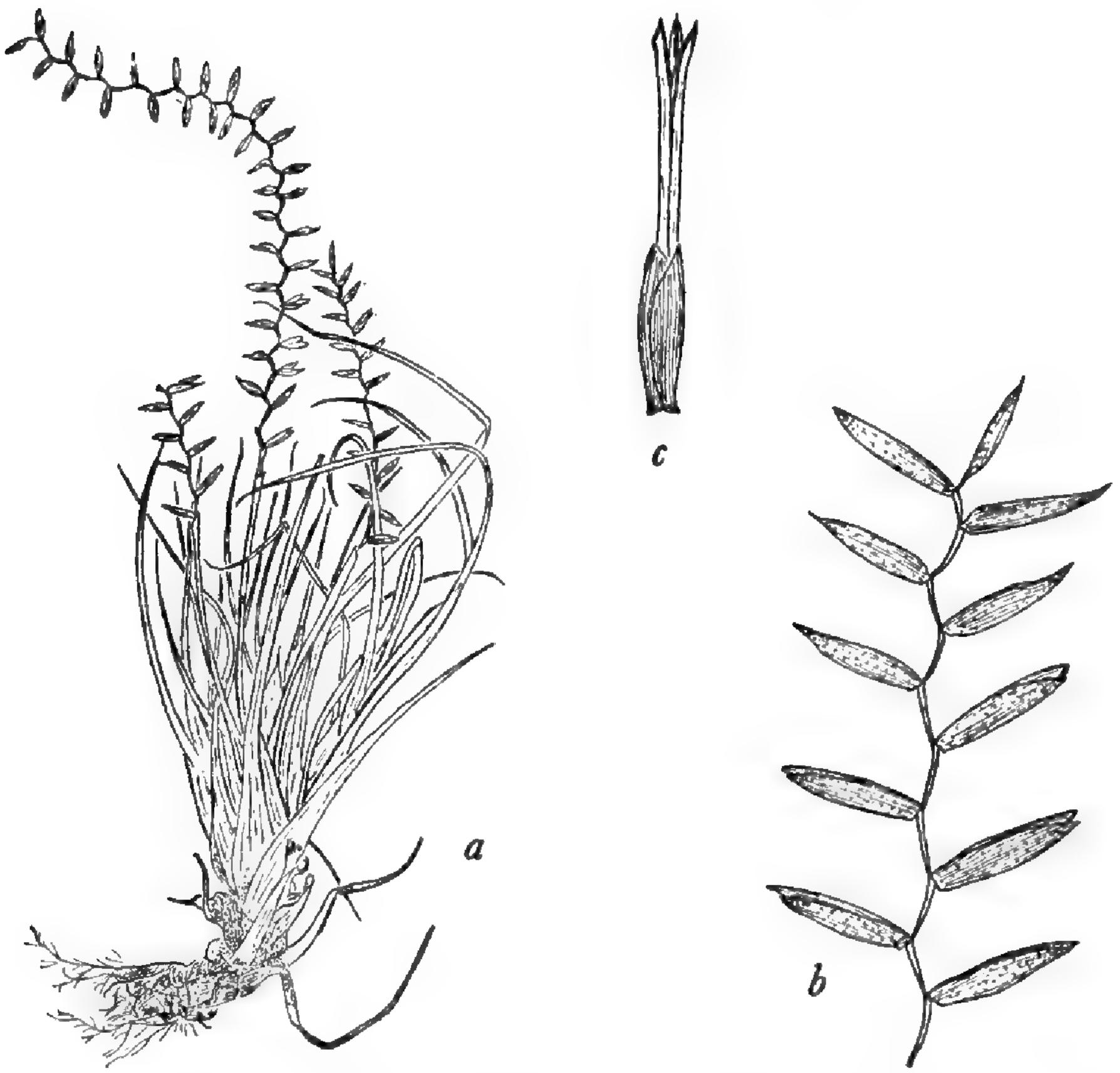

FIGURE 72.—*Tillandsia narthecioides: a*, Habit, ×1/5; *b*, section of inflorescence, ×1; *c*, sepals and capsule, ×1. (Drawn by R. J. Downs.)

TYPE LOCALITY: Guayaquil, Ecuador Type collected by Haenke.

DISTRIBUTION: Region of the Province of Guayas, Ecuador.

ECUADOR: April 26, 1892, *Eggers* 14272 (F).

GUAYAS: Guayaquil, 1790–91, *Haenke* (Prague, type). Near Balao, Jan. 1892, *Eggers* 14277 (Berlin, Macbride photo No. 11518; US). On tree, Teresita, 3 km. west of Bucay, alt. 270 m., July 5–7, 1923, *Hitchcock* 20407 (US). On tree in tropical "cacao" region, Naranjal, alt. 20 m., 1925, *Mille* 35 (F, NY).

GUAYAS, CAÑAR, CHIMBORAZO, and BOLÍVAR junction: Epiphyte, foothills of the western cordillera near Bucay, alt. 300–375 m., June 8–15, 1945, *Camp* E–3676 (US).

35. Tillandsia (Phytarrhiza) **scaligera** Mez & Sodiro, Bull. Herb. Boiss. II. **5:** 107. 1905. FIGURE 73

Stemless, 33 cm. to nearly 50 cm. high; leaves 20–40 in a subfasciculate rosette, 25–30 cm. long, densely and minutely pale-appressed-lepidote throughout; sheaths distinct, elliptic, 4 cm. long; blades linear-triangular, long-acuminate, 10–12 mm. wide, chartaceous when dry; scape erect, slender, shorter than to barely exceeding the leaves, glabrous; scape-bracts exceeding the internodes, elliptic, acute, the lower ones with foliaceous blades, the upper apiculate, nerved; inflorescence simple, lax, linear, many-flowered, 13–18 cm. long,

3.5–4 cm. wide; rhachis wholly exposed by the bracts, straight and not at all geniculate, angled with decurrent lines from the bracts, slightly thickened at the insertion of the flowers, glabrous, internodes

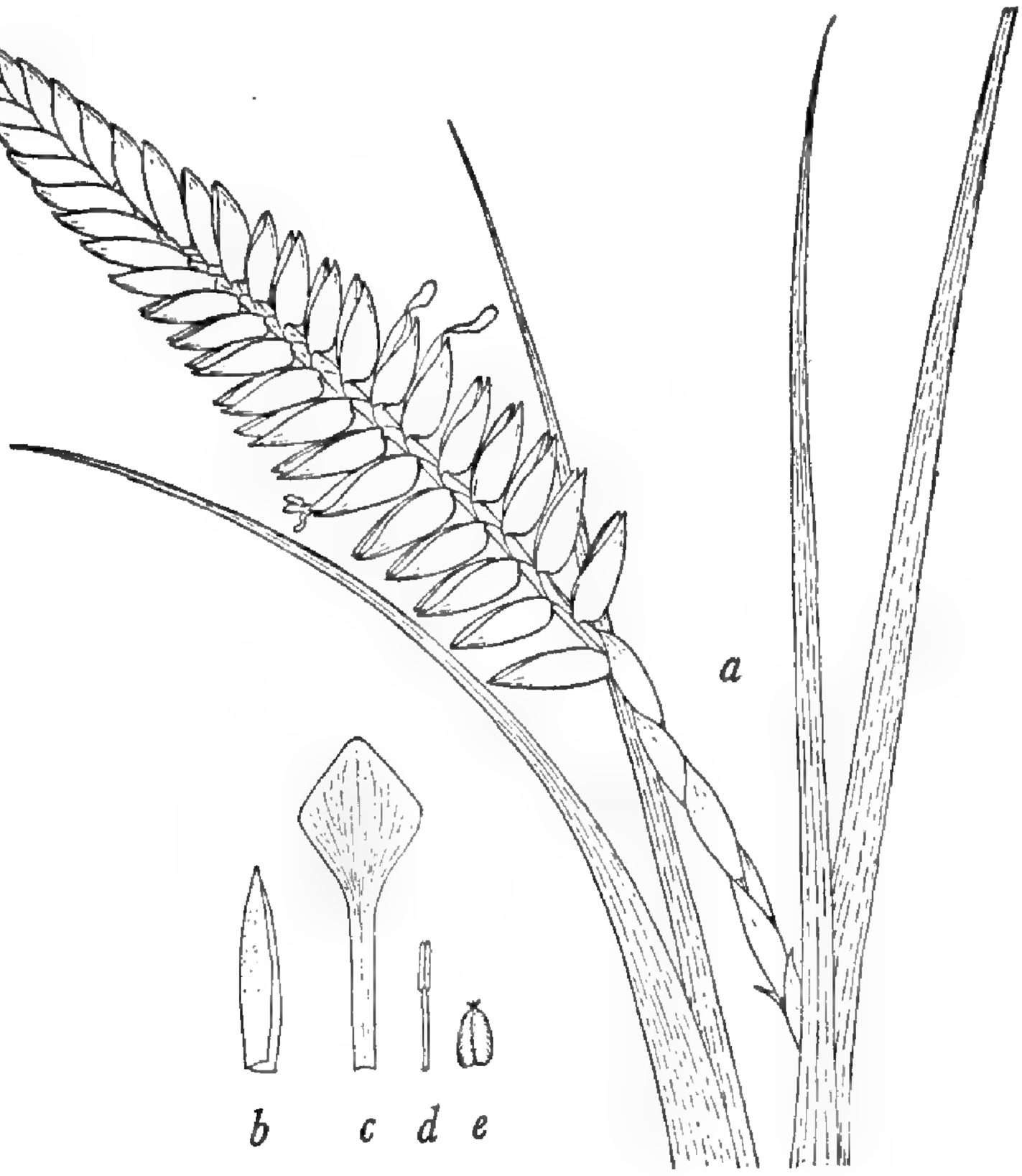

FIGURE 73.—*Tillandsia scaligera: a*, Upper part of habit, ×1/2; *b*, sepal, ×1; *c*, petal, ×1; *d*, stamen, ×1; *e*, pistil, ×1.

ca. 5 mm. long; floral bracts spreading, triangular-ovate, 18–19 mm. long, equaling or slightly shorter than the sepals, carinate, faintly nerved, lepidote toward the apex, becoming glabrous; flowers fragrant, appearing sessile because the short pedicel continues the lines of the sepals; sepals free, elliptic, acute, rigid, faintly nerved, nearly glabrous outside, subdensely brown-lepidote inside, the posterior ones sharply carinate; petals white, the blade rhombic, broadly acute, 11 mm. long; stamens deeply included, much exceeding the pistil; capsule fusiform-cylindric, very slender, 40–45 mm. long.

TYPE LOCALITY: "Ecuador, in silvis tropicis secus flumen Pilateu." Type collected by Sodiro (No. 171/4).

DISTRIBUTION: Ecuador.

ECUADOR:

PICHINCHA: Río Pilatón, alt. 800 m., Sept., *Sodiro* 171/4 (Berlin, type).

LOJA: Epiphytic in "hojarasca" forest, Torata (road to Santa Rosa), alt. ca. 60–80 m., Dec. 26, 1946, *R. Espinosa* E–1176 (GH).

I started to make the Espinosa material a new species on the basis of its having internodes only half as long as the 10-mm. given in the

original description of *Tillandsia scaligera*. However, the description also says that the inflorescence is distichous, 38-flowered and 18 cm. long, all of which is impossible in combination with a 10-mm. internode but very good with one of 5 mm. Apparently two internodes were measured for one on the type. The remaining discrepancies of indument and dimensions are easily discounted by the fact that the type is in fruit, while the Espinosa material has matured only about half of its flowers.

36. Tillandsia (? Phytarrhiza) **cornuta** Mez & Sodiro, Bull. Herb. Boiss. II. **5**: 106. 1905. FIGURE 74

Stem short, rhizomatose, flowering plant ca. 4 dm. high; leaves fasciculate-rosulate, about 10, 6 dm. long, densely appressed-lepidote throughout, slightly canescent when dry; sheaths elongate, indistinct; blades 15 mm. wide at the base, filiform-acuminate; scape erect, rather stout, much shorter than the leaves, glabrous; scape-bracts all exceeding the internodes, the lower bearing long subfiliform reflexed blades, the upper abruptly acute, rigid, sublustrous; inflorescence simple, linear, 12–17-flowered, 10–12 cm. long, 28 mm. wide, lax; rhachis scarcely thickened at the insertion of the flowers, angled with 4 decurrent lines from the bases of the bracts, glabrous, slightly geniculate toward the base, internodes 6–9 mm. long; floral bracts divergent but not at all imbricate or concealing the rhachis, broadly ovate, apiculate, ca. 18–22 mm. long, slightly shorter than the sepals in fruit, ecarinate, rigid, even or slightly nerved toward the apex; flowers sessile; sepals slightly connate posteriorly, obtuse, rigid, even, glabrous; petals white (! Foster); capsule subcylindric, very slender, 55–60 mm. long.

TYPE LOCALITY: Near Balsapamba, Ecuador. Type collected by Sodiro (No. 171/42).

DISTRIBUTION: Ecuador.

ECUADOR:

ESMERALDAS: Dense moist jungle, Quito–Santo Domingo road, alt. 600 m., Dec. 9, 1948, *Foster* 2636 (US).

BOLÍVAR: In tropical forest, near Balsapamba, Oct., *Sodiro* 171/42 (Berlin, type).

The Foster specimen agrees quite well with the description of the type except that the floral bracts slightly exceed the sepals but this discrepancy may well be due to the difference in age. The Foster plant is just beginning to flower, the type is in fruit.

37. Vriesia (Xiphion) **goniorachis** (Baker) Mez in Mart. Fl. Bras. **3**: 545. 1894. FIGURE 74

Tillandsia goniorachis Baker, Journ. Bot. Brit. & For. **25**: 303. 1887.

Flowering plant up to 7 dm. high; leaves many in a crateriform rosette, 3–4 dm. long, densely appressed-lepidote throughout; sheaths

broadly elliptic, minutely brown-lepidote; blades narrowly triangular, 3 cm. wide, recurved toward the apex, concolorous, green, cinereous-lepidote; scape curved, stout; scape-bracts erect, the lower foliaceous

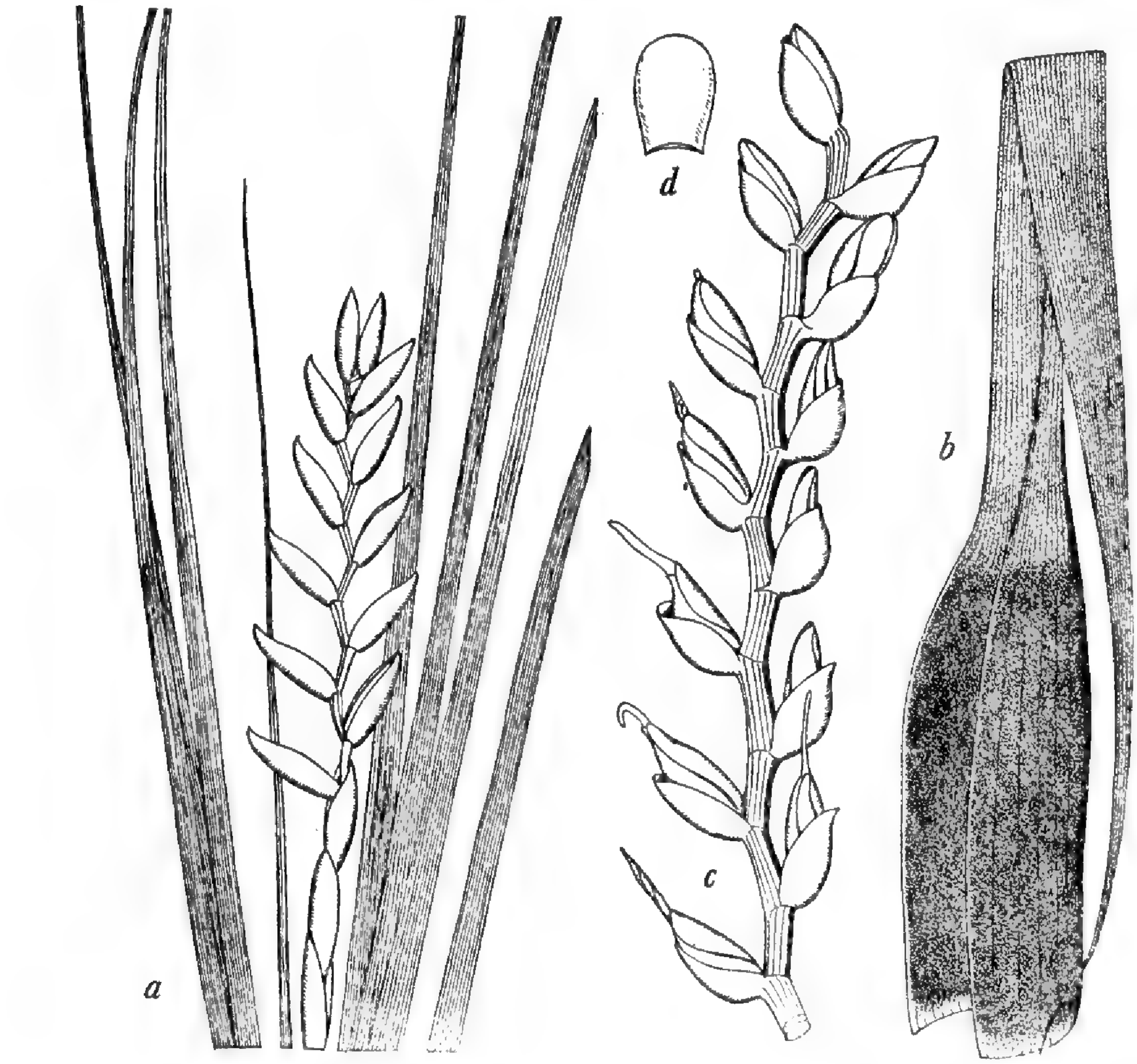

FIGURE 74.—*Tillandsia cornuta: a*, Upper part of habit, ×1/2. *Vriesia goniorachis: b*, Leaf, ×1/2; *c*, inflorescence, ×1/2; *d*, sepal, ×1/2.

and densely imbricate, the upper vaginiform, acute or obtuse, equaling or slightly shorter than the internodes; inflorescence simple, lax, many-flowered, linear, 30 cm. long, 4 cm. wide; rhachis stout, geniculate; floral bracts suborbicular, obtuse, 2 cm. long, much shorter than the sepals, scarcely carinate, fleshy-coriaceous; flowers divergent, not at all secund; pedicels obconic, very stout, 5 mm. long; sepals broadly elliptic, truncate-obtuse, 22 mm. long, 15 mm. wide, ecarinate; petals greenish yellow, almost 4 cm. long, bearing two large acuminate scales.

TYPE LOCALITY: "South Brazil." Lectotype collected by Glaziou (No. 15471).

DISTRIBUTION: Vicinity of Rio de Janeiro, Brazil.

BRAZIL:

FEDERAL DISTRICT (?): Pedra do Ilheu, Andarahy Grande, near Rio de Janeiro, Sept. 1884, *Glaziou* 15471 (K, lectotype; GH, P, Copenhagen, Macbride photo No. 22335).

Mez cites also *Glaziou* 16462 from Pão d'Assucar and *Ule* s. n. from Tijuca, both in the city of Rio de Janeiro.

38. Vriesia (? Vriesia) **jimenezii** Mez & Tonduz, Repert. Sp. Nov. Fedde **14:** 246. 1916.

Flowering plant barely over 4 dm. high, slender; leaves subutriculate, up to 4 dm. long, barely 20 mm. wide, the sheaths and the lower part of the blades dorsally marked with transverse brown bands, acuminate, the apex produced into a mucro 10 mm. long but not pungent; scape erect, less than half as long as the leaves; scape-bracts with a mucronate blade like the leaves, exceeding the internodes; inflorescence lanceolate, acute at both ends, 70 mm. long, 18 mm. wide, compressed, 3-flowered; floral bracts barely imbricate, ovate, acuminate, 45 mm. long, much exceeding the sepals, mucronate, slightly incurved, strongly carinate, glabrous; flowers erect, imperfectly known; sepals elliptic, broadly acute, 30 mm. long, 11 mm. wide, coriaceous, free.

TYPE LOCALITY: Near San Ramón, Costa Rica. Type collected by Tonduz (No. 17899 in hb. Inst. Phys.-geogr. Costar.).

DISTRIBUTION: Known only from the type.

COSTA RICA:

CARTAGO (?): Forests of Tremendal, near San Ramón, alt. 1,300–1,400 m., May, *Tonduz in hb. Inst. Phys.-geogr. Costar.* 17899 (Berlin, type).

39. Vriesia (Vriesia) **barclayana** (Baker) L. B. Smith, comb. nov.

FIGURE 75

Tillandsia barclayana Baker, Journ. Bot. Brit. & For. **25:** 239. 1887.

Tillandsia lateritia André, Énum. Bromél. 6. Dec. 13, 1888; Rev. Hort. **60:** 566. Dec. 16, 1888.

Stemless, about 5 dm. high; leaves about 15 in a utriculate rosette, 4–5 dm. long, densely and minutely appressed-lepidote; sheaths large, elliptic, distinct from the blades, brown; blades linear-triangular, acuminate, 15 mm. wide at the base; scape erect, stout; scape-bracts erect, densely imbricate, elliptic, lepidote, even, the lower laminate, the upper acute or obtuse; inflorescence simple, lance-ovate to oblong, complanate, dense, 12–16-flowered, 10–30 cm. long, 35 mm. wide; rhachis straight, broadly winged and enfolding the bases of the flowers, densely lepidote; floral bracts imbricate, obovate, triangular-acute, 3–4 cm. long, equaling or exceeding the sepals, convex, obscurely carinate, coriaceous, lepidote toward the apex; flowers short-pedicellate; sepals free, elliptic, acute or apiculate, 18–21 mm. long, coriaceous, even, glabrous or somewhat lepidote toward the base; petals slightly shorter than the stamens, violet, bearing two large scales; capsule ca. 3 cm. long.

ILLUSTRATIONS: Brom. Andr. *pl. 21.*

TYPE LOCALITY: Valdivia, Guayas, Ecuador. Type collected by Barclay (No. 622).

DISTRIBUTION: Southern Ecuador.

ECUADOR:

GUAYAS: Woods of Valdivia, 1836, *Barclay* 622 (BM, type). Epiphytic, Balao, Mar. 1892, *Eggers* 14582 (M).

EL ORO: On tree, dry hill, Portovelo (gold mine near Zaruma), alt. 600–1,000 m., Aug. 30–Sept. 1, 1923, *Hitchcock* 21247 (GH, US). On trees by the river, Río Calera (Zaruma), alt. ca. 820 m., Aug. 21, 1947, *R. Espinosa* E 1840 (US).

Los Ríos: Epiphytic, in tropical zone, Sabanetas, July 1876, *André* 4057 (K, type of *Tillandsia lateritia* André).

CHIMBORAZO: On rock, cañon of Río Chanchan, from Naranjapata to below Huigra, alt. 600–900 m., June 19, 1945, *Camp* E-3899 (US).

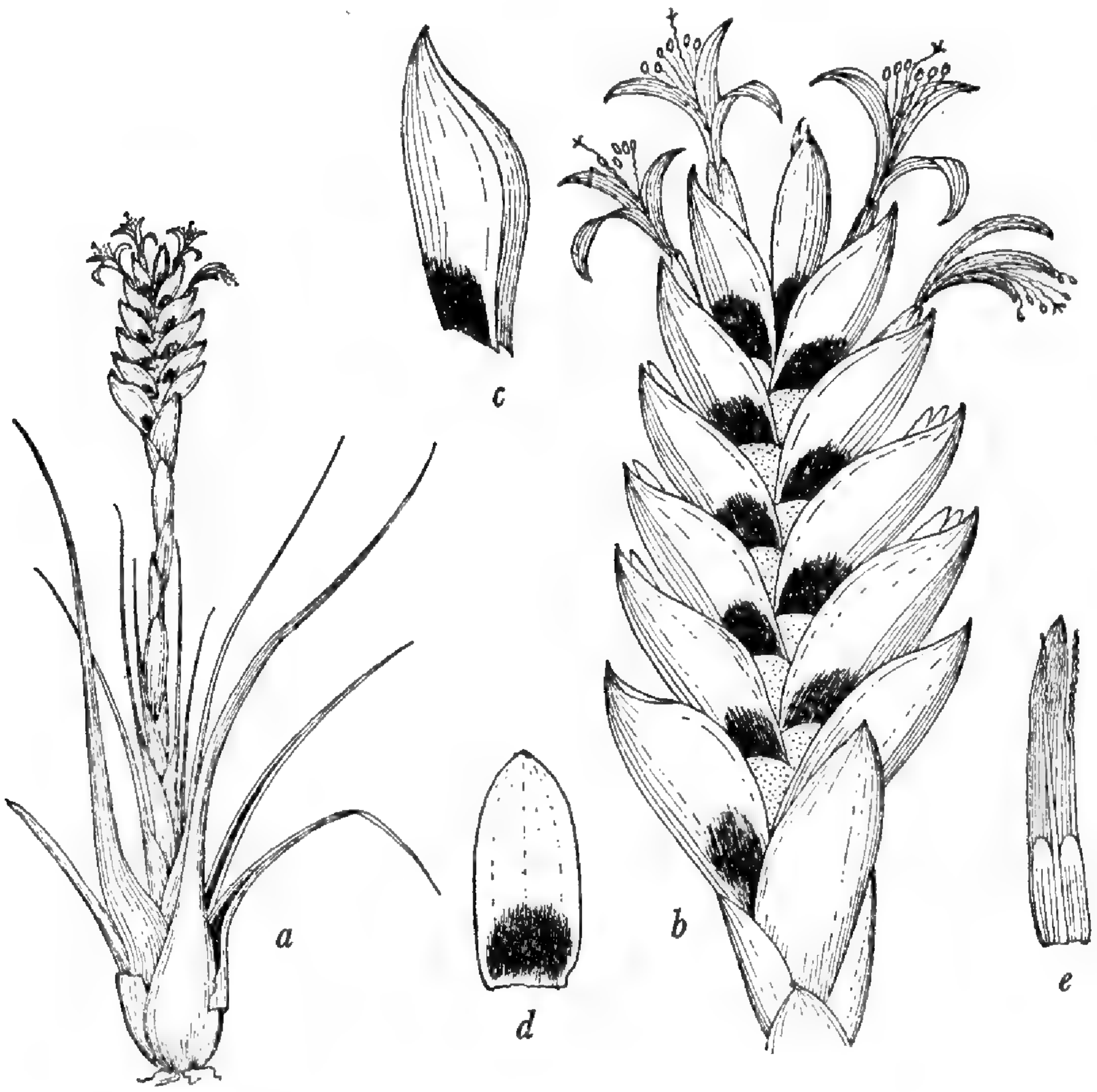

FIGURE 75.—*Vriesia barclayana: a*, Habit, ×1/4; *b*, inflorescence, ×1; *c*, floral bract, ×1, after André, Brom. Andr.; *d*, sepal, ×1 *e*, petal and filaments, ×1.

André says that the petals are shorter than the stamens and Mez that they are longer, but André would appear to be correct. The Hitchcock collection shows large scales on the petals indicating that the species belongs in *Vriesia*.

40. Vriesia (Xiphion) **chontalensis** (Baker) L. B. Smith, comb. nov. FIGURE 76

Tillandsia chontalensis Baker, Journ. Bot. Brit. & For. **25:** 237. 1887.

Tillandsia spuria Mez & Wercklé, Repert. Sp. Nov. Fedde **16:** 74. 1919.

Stemless, less than 2 dm. high; leaves densely rosulate, 12–14 cm. long, densely appressed-lepidote throughout; sheaths suborbicular, 25 mm. wide, castaneous-lepidote, often forming a subglobose rosette; blades erect, linear-triangular, 10–12 mm. broad at the base, acuminate,

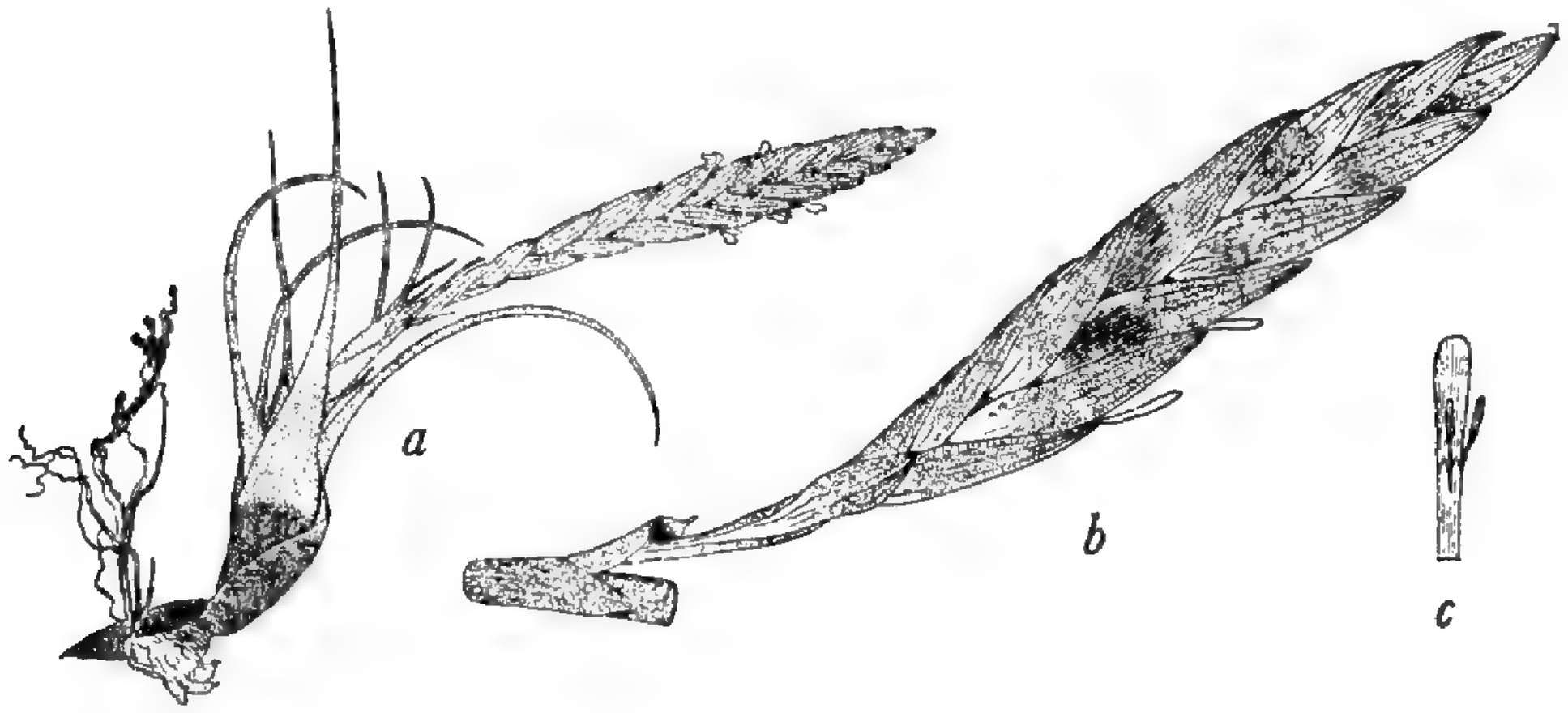

FIGURE 76.—*Vriesia chontalensis: a*, Habit (type specimen, with only a few inner leaves remaining), ×1/2; *b*, lateral branch of compound inflorescence, ×1; *c*, petal and stamens, ×1.

involute, rigid when dry, cinereous-lepidote; scape erect or ascending, distinctly shorter than the leaves; scape-bracts densely imbricate, making the scape appear 5 mm. thick, broadly ovate, caudate, roseate, densely appressed-lepidote; inflorescence simple or digitate with 2–6 spikes; primary bracts like the scape-bracts, inconspicuous; spikes linear-lanceolate with an attenuate base of several sterile bracts, acute, complanate, 4–8 cm. long, 10–12 mm. wide, densely 6–14-flowered; floral bracts suberect, three to four times as long as the internodes but partially exposing the rhachis, triangular-ovate, up to 16 mm. long and 9 mm. wide, equaling or exceeding the sepals, carinate, submembranaceous, prominently nerved, appressed-lepidote, roseate toward the apex; flowers subsessile; sepals lanceolate, acute, 10–12 mm. long, subfree, chartaceous, glabrous; petals oblong, subtruncate, 12–18 mm. long, denticulate, pale green, bearing 2 scales with long attached bases and small free apices; stamens and pistil shorter than the petals; capsule barely exserted from the bracts.

ILLUSTRATIONS: Contr. Gray Herb. **89:** *pl. 3, figs. 5–7.*

TYPE LOCALITY: Vicinity of Chontales, Department of Chontales, Nicaragua. Type collected by R. Tate (No. 413).

DISTRIBUTION: Nicaragua, Costa Rica, Panama (?), southwestern Colombia.

NICARAGUA:

CHONTALES: Vicinity of Chontales, 1867–68, *R. Tate* 413 (K, type; BM).

COSTA RICA:

SAN JOSÉ: San Jerónimo, alt. 1,500 m., Mar. 1909, *P. Biolley f.* 17369 (US). On trunks and logs in forest, near El General, alt. 1,220 m., Feb. 1936, *Skutch* 2559 (GH, US).

CARTAGO: Las Cóncavas, *Wercklé* (B, type of *Tillandsia spuria* Mez & Wercklé; GH, US). El Muñeco south of Navarro, alt. ca. 1,400 m., Feb. 8, 9, 1924, *Standley* 33804 (US); alt. 1,400–1,500 m., Mar. 6, 7, 1926, *Standley & Torres* 51781 (US).

PANAMA:

CHIRIQUÍ: Base of Volcano Chiriquí, alt. 1,000 m., *Pfau* (! Mez, apparently on the basis of cultivated material).

COLOMBIA:

EL VALLE: Epiphytic in woods, Piedra de Moler, left bank of the mouth of the Río Digua, west slope of the Cordillera Occidental, alt. 900–1,180 m., Aug. 19–28, 1943, *Cuatrecasas* 15188 (GH).

In the Pflanzenreich, Mez tried to maintain *Tillandsia spuria* as a distinct species by placing it in a separate subgenus from that of *T. chontalensis*. However, he placed it there on the basis of petals and stamens which he did not see, according to his own description, and material of the type collection of *T. spuria* in the U. S. National Herbarium shows the flowers to be not as Mez supposed but identical with those of *T. chontalensis*. Finally the presence of scales on the petals necessitates the transfer of the species to *Vriesia*.

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FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 29, PART 11

STUDIES IN THE BROMELIACEAE, XVII

By LYMAN B. SMITH

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PREFACE

The present paper, by Lyman B. Smith, associate curator of the Department of Botany, U. S. National Museum, is the seventeenth in his series of studies of the family Bromeliaceae. New and noteworthy species from Mexico to Bolivia are discussed. Sixteen species and one variety are described as new.

JASON R. SWALLEN,
Head Curator, Department of Botany,
United States National Museum.

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STUDIES IN THE BROMELIACEAE, XVII[1]

By Lyman B. Smith

INTRODUCTION

The notes and novelties that follow are published here as a miscellany since there is no prospect of their inclusion in any comprehensive work in the near future. As in numbers XV and XVI of this series, the species are arranged geographically to facilitate their use in floristic studies.

I am indebted to those in charge of the herbaria of the following institutions for the opportunity to examine their material: the British Museum of Natural History (BM); the Gray Herbarium of Harvard University (GH); the Institute of Jamaica; the Royal Botanic Gardens, Kew (K); the Rijks Herbarium of Leiden (L); the Botanical Museum of Munich (M); the New York Botanical Garden (NY); the United States National Museum (US); and the United States National Arboretum. Subsequent to the submission of this paper for publication, all material studied at the National Arboretum has been transferred to the National Museum.

All drawings with the exception of those for *Pitcairnia mooreana*, *P. sandemanii*, and *Tillandsia cacticola* have been made by R. J. Downs.

MEXICO

Hechtia laxissima L. B. Smith, sp. nov. FIGURE 77

A *H. meziana* L. B. Smith, cui affinis, bracteis florigeris minimis quam pedicellis conspicuis brevioribus, floribus subduplo minoribus, minus roseis differt.

Flowering plant over 1.7 meters high, very slender and graceful; leaves over 4 dm. long, the blades narrowly triangular, 4 cm. wide, glabrous above, beneath finely nerved and covered with pale appressed scales, laxly armed with pale slender spines 4 mm. long; scape flattened at base indicating that it is probably lateral, about 1 cm. in diameter, glabrous; scape-bracts all small and remote, triangular, acuminate, thin, stramineous; inflorescence very laxly bipinnate, glabrous; primary bracts narrowly triangular, much shorter than the sterile bases

[1] Number XVI of this series, "Studies in the Bromeliaceae," was published in Contr. U. S. Nat. Herb. **29** (10) 1951.

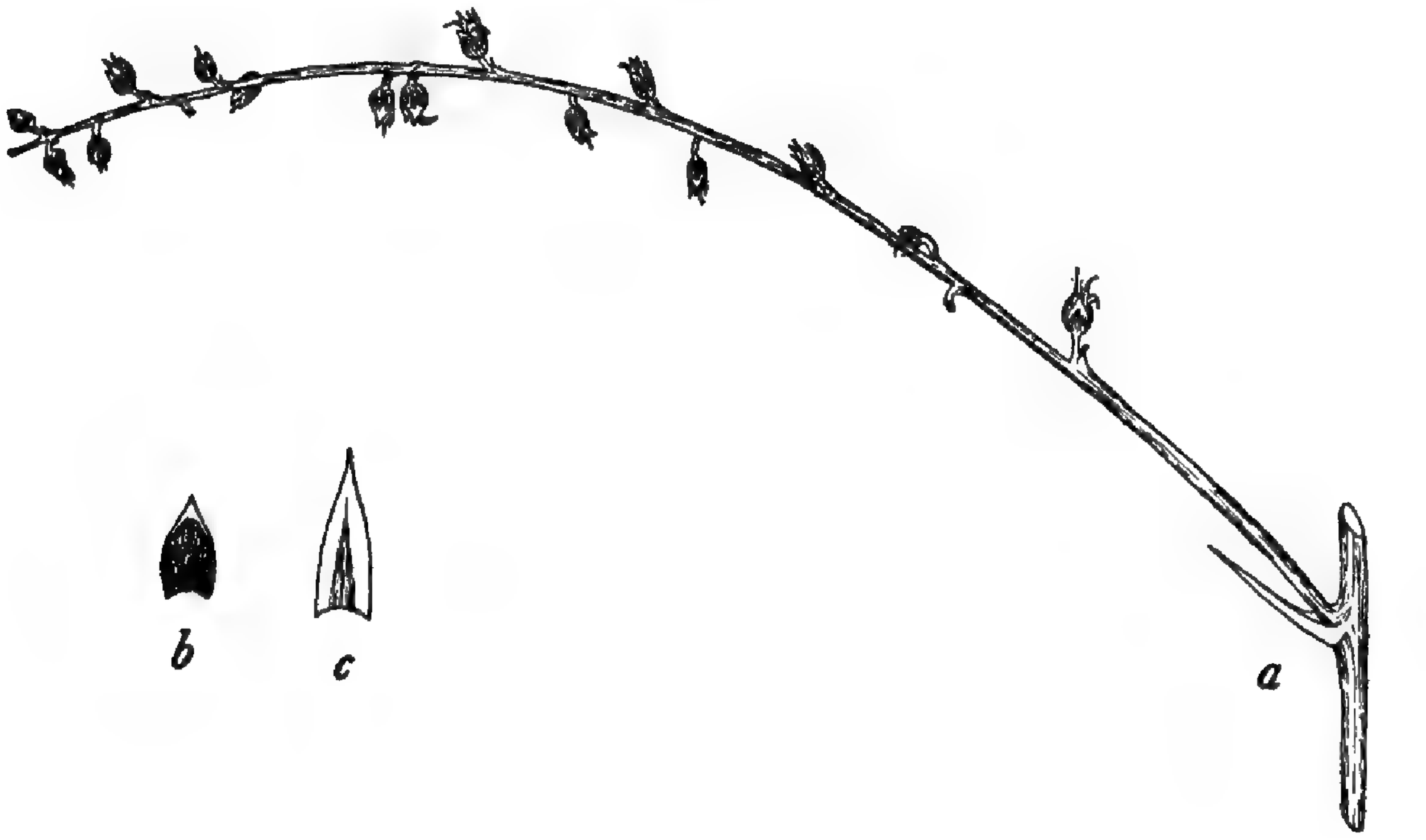

FIGURE 77.—*Hechtia laxissima: a*, Branch of inflorescence, × 1; *b*, sepal, × 2; *c*, petal, × 2.

of the branches; branches spreading or ascending, very slender, 20 cm. long, slightly if at all flexuous, very laxly flowered; floral bracts ovate, acute, mostly about half as long as the pedicels, thin, greenish rose; pedicels slenderly cylindric, 2–4 mm. long; flowers spreading, only the pistillate known; sepals very broadly ovate, acute, 3 mm. long, dark rose with a greenish tinge; petals ovate, acute, 5 mm. long, green with roseate tips; ovary glabrous.

Type in the U. S. National Herbarium, No. 1979365, collected on rock by the bridge in Cañon de Marquez between Nueva Italia and Nueva Lombardia, State of Michoacan, Mexico, altitude 420 meters, November 16, 1949, by H. E. Moore, Jr., E. Hernandez X., and H. Porras H. (No. 5770).

Hechtia mooreana L. B. Smith, sp. nov. FIGURE 78

A *H. pedicellata* Watson, cui affinis, scapi bracteis remotis, ramis dense florigeris, pedicellis brevioribus differt.

Caulescent with an ascending stem 36 cm. long, flowering shoot 1.2 meters high; leaves densely imbricate, 3 dm. long, the sheaths suborbicular, 3 cm. long, glabrous except for the exposed apex, the blades narrowly triangular, acuminate, pungent, 15 mm. wide, covered on both sides with appressed cinereous scales, laxly armed with pale curved spines 2 mm. long; scape elongate, 9 mm. in diameter, glabrous; scape-bracts small and remote, triangular, thin, stramineous; inflorescence slenderly cylindric, laxly bipinnate, glabrous; primary bracts lost but evidently small; branches slender, divergent to spreading, 4-5 cm. long, densely flowered to the base; floral bracts triangular, acuminate, much shorter than the pedicels, thin; pedicels slenderly obconic, 2 mm. long, sulcate; flowers more or less upwardly secund,

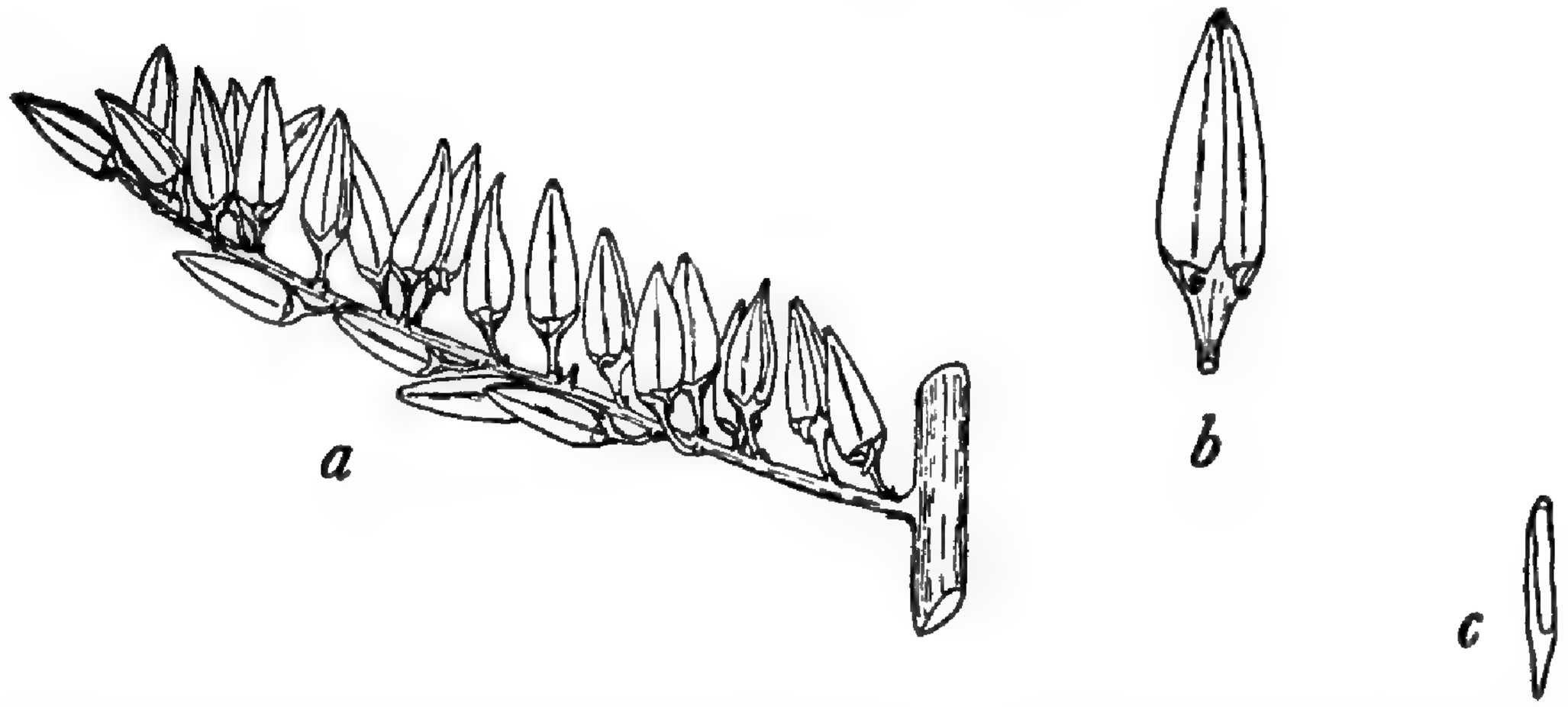

FIGURE 78.—*Hechtia mooreana: a*, Branch of inflorescence, × 1; *b*, flower and capsule, × 2; *c*, seed, × 2.

only the pistillate known; sepals very broadly ovate, acute, 2 mm. long, thin except at base; petals triangular, acute, 3 mm. long; capsule slenderly ovoid, brown, slightly rugose; seeds oblong with a broad apical wing.

Type in the U. S. National Herbarium, No. 1978457, collected on steep slopes, limestone talus and riversides by road, vicinity of kilometer 278, Cañon del Zopilote between Mexcala and Zumpango, State of Guerrero, Mexico, altitude 810 meters, October 3, 1949, by H. E. Moore, Jr. (No. 5196).

Pitcairnia mooreana L. B. Smith, sp. nov. FIGURE 79

A *P. tuerckheimii* Donn. Smith, cui affinis, pedicellis elongatis bracteas florigeras superantibus, floribus minoribus differt.

Flowering plant 7 dm. high; leaves in a dense pseudobulb, probably dimorphic but only the inner known, the sheaths suborbicular, 4 cm. long, brown lustrous and glabrous except for the cinereous-lepidote apex, the blades deciduous along a straight transverse line, linear, acuminate, 46 cm. long, 10 mm. wide, entire, glabrous, the persistent base of the blade cinereous-lepidote and armed with slender dark curved spines; scape erect, glabrous; scape-bracts erect, the lower with elongate linear serrate blades, the upper ovate, acute, shorter than the internodes; inflorescence laxly racemose, glabrous; floral bracts broadly ovate, apiculate, shorter than the pedicels, green;

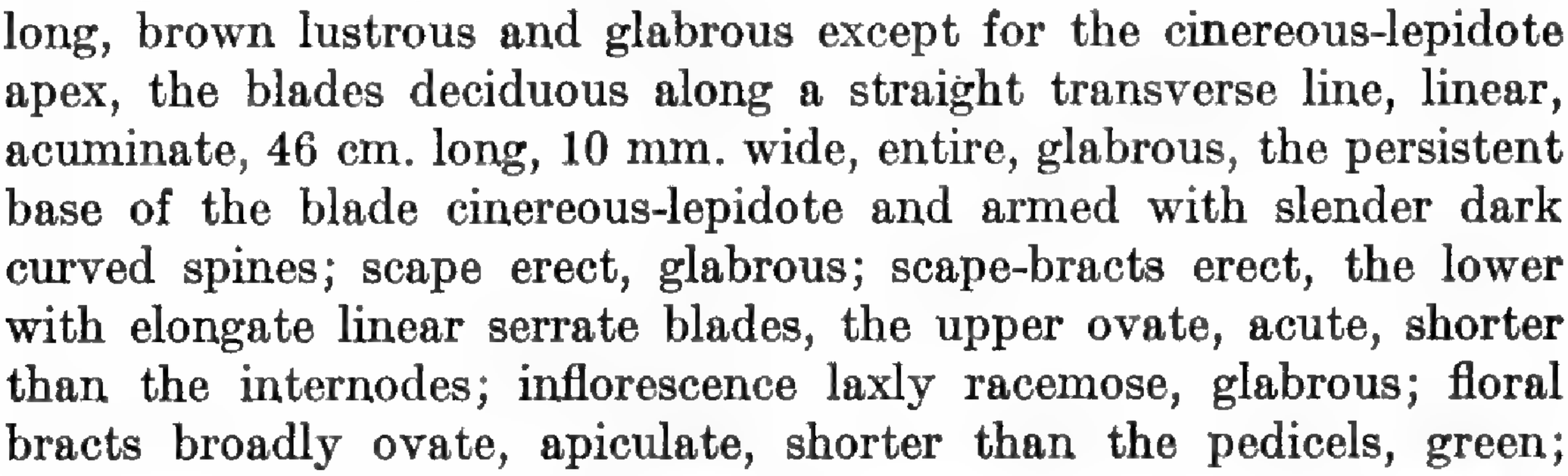

FIGURE 79.—*Pitcairnia mooreana: a*, Flower and floral bract, × 1; *b*, sepal, × 1.

pedicels slender, 15 mm. long; flowers ascending at anthesis, later reflexed; sepals lance-oblong, acute, 24 mm. long, ecarinate; petals 7 cm. long, reddish green, naked, equaling the stamens; ovary 2/3 superior; ovules caudate.

Type in the U. S. National Herbarium, No. 1979364, collected on steep grassy slopes and narrow ravine with open pine woods and scattered oaks on granitic soil at km. 339–40 between Acahuizotla and Agua del Obispo on highway to Acapulco, State of Guerrero, Mexico, altitude ca. 900 meters, September 30, 1949, by H. E. Moore, Jr. (No. 5117).

JAMAICA

Vriesia gibba L. B. Smith, sp. nov. FIGURE 80

A *V. alta* (Baker) E. Morren ex Mez, cui affinis, foliis parvis, floribus secundis, sepalis omnino ecarinatis, petalis subduplo minoribus differt.

Known only from fragments but the flowering plant undoubtedly over 1 meter high; leaves to 66 cm. long, the sheaths ample, dark castaneous, punctulate-lepidote, the blades ligulate, acuminate, 7 cm. wide, flat, green, concolorous, obscurely punctulate-lepidote beneath, glabrous above; scape unknown; inflorescence very laxly bipinnate; primary bracts broadly ovate, the lower ones with a narrowly triangular blade exceeding the mostly 2-prophyllate bases of the branches; branches divergent to spreading, subdensely 7–10-flowered, the rhachis flexuous, slender, angled; floral bracts more or less secund with the flowers, broadly obovate, truncate, 25–30 mm. long, about twice as long as the internodes, much exceeded by the sepals, coriaceous,

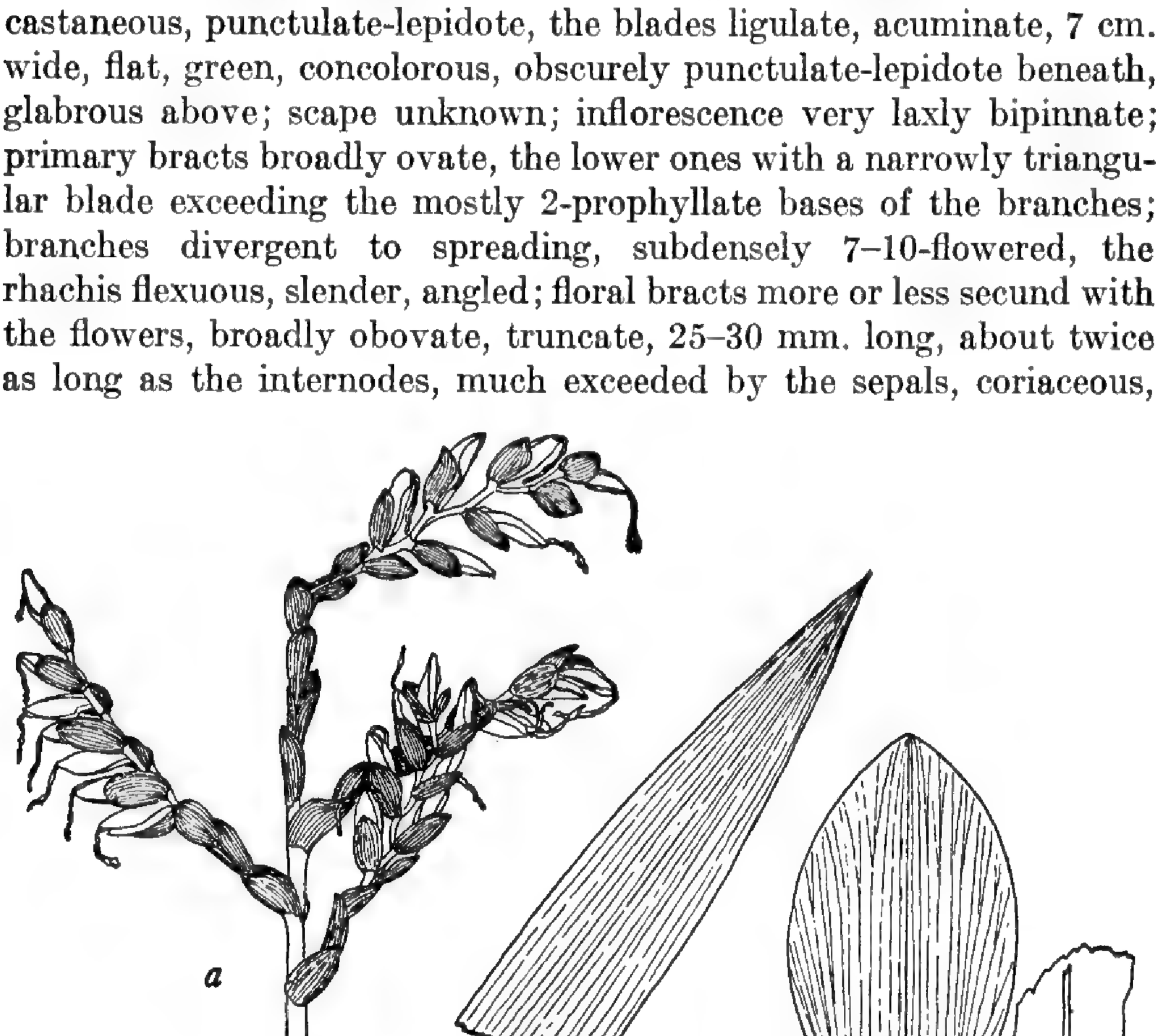

FIGURE 80.—*Vriesia gibba: a*, Upper part of inflorescence, × 1/5; *b*, apex of leaf, × 1/5; *c*, sepal, × 1; *d*, base of petal, × 1.

pale green when dry, obscurely punctulate-lepidote, carinate toward the apex, strongly gibbous about one third below the apex; pedicels to 10 mm. long; flowers deflexed-secund; sepals ovate, obtuse, to 32 mm. long, coriaceous and castaneous with a broad thin pale margin, ecarinate, glabrous; petals 6 cm. long, equaling the stamens, bearing two large acute scales at base, the long narrow blades soon drooping.

Type in the Institute of Jamaica, collected on trees, Knox College, Spaldings, Parish of Manchester, Jamaica, altitude ca. 600 m., July 20, 1949, by Kathleen Dignum (No. 2785).

ADDITIONAL SPECIMEN EXAMINED:

JAMAICA:

MANCHESTER: On tree, woodlands near Newport, Sept. 3–7, 1908, *N. L. Britton* 3208 (NY, US).

In the North American Flora (**19**: 159), the Britton collection which is in fruit was the basis for my citation of *Vriesia alta* from Jamaica. The Dignum collection with corollas and stamens shows that such a view is not correct.

SURINAME

Aechmea lateralis L. B. Smith, sp. nov. FIGURE 81

A *Ae. magdalenae* (André) André ex Baker, *Ae. fernandae* (E. Morr.) Baker, et *Ae. rubiginosa* Mez, quibus affinis, scapis lateralibus, scapi vaginis minimis, squamiformibus differt.

Cespitose in large masses, proliferating by short erect basal branches, the flowering shoots lateral, to 35 cm. long, radiating from the base of the plant; leaves to 2.4 m. long, the sheaths relatively small, coarsely brown-furfuraceous, the blades linear, at least 3 cm. wide, deeply channeled, brown-furfuraceous beneath, laxly armed with flat uncinate spines 4 mm. long; scapes 7 mm. broad, compressed; scape-bracts triangular-ovate, acute, serrulate, red, pale-lepidote, the upper ones imbricate, the lower about equaling the internodes and exposing most of the scape; inflorescence simple, strobilate, globose or ellipsoid, 5 cm. in diameter, reddish green, covered with coarse pale brown appressed scales; floral bracts erect, broadly ovate, acute, 35 mm. long, exceeding the sepals at anthesis; flowers sessile; sepals asymmetric, triangular, acuminate, pungent, 30 mm. long, free, coriaceous, the posterior ones carinate; petals broadly elliptic, acute, 15 mm. long, fleshy except for the thin margins, bearing two narrowly sacciform lacerate scales at the base; stamens included; ovary ellipsoid, compressed, the epigynous tube shallowly infundibuliform; placentae apical; ovules few; seeds cochleate, 5 mm. long, longitudinally striate.

Type in the U. S. National Herbarium, No. 1951856, collected on ground in swampy forest, Paramaribo, Suriname, altitude 15 meters, October 2, 1948, by M. B. Foster (No. 2387).

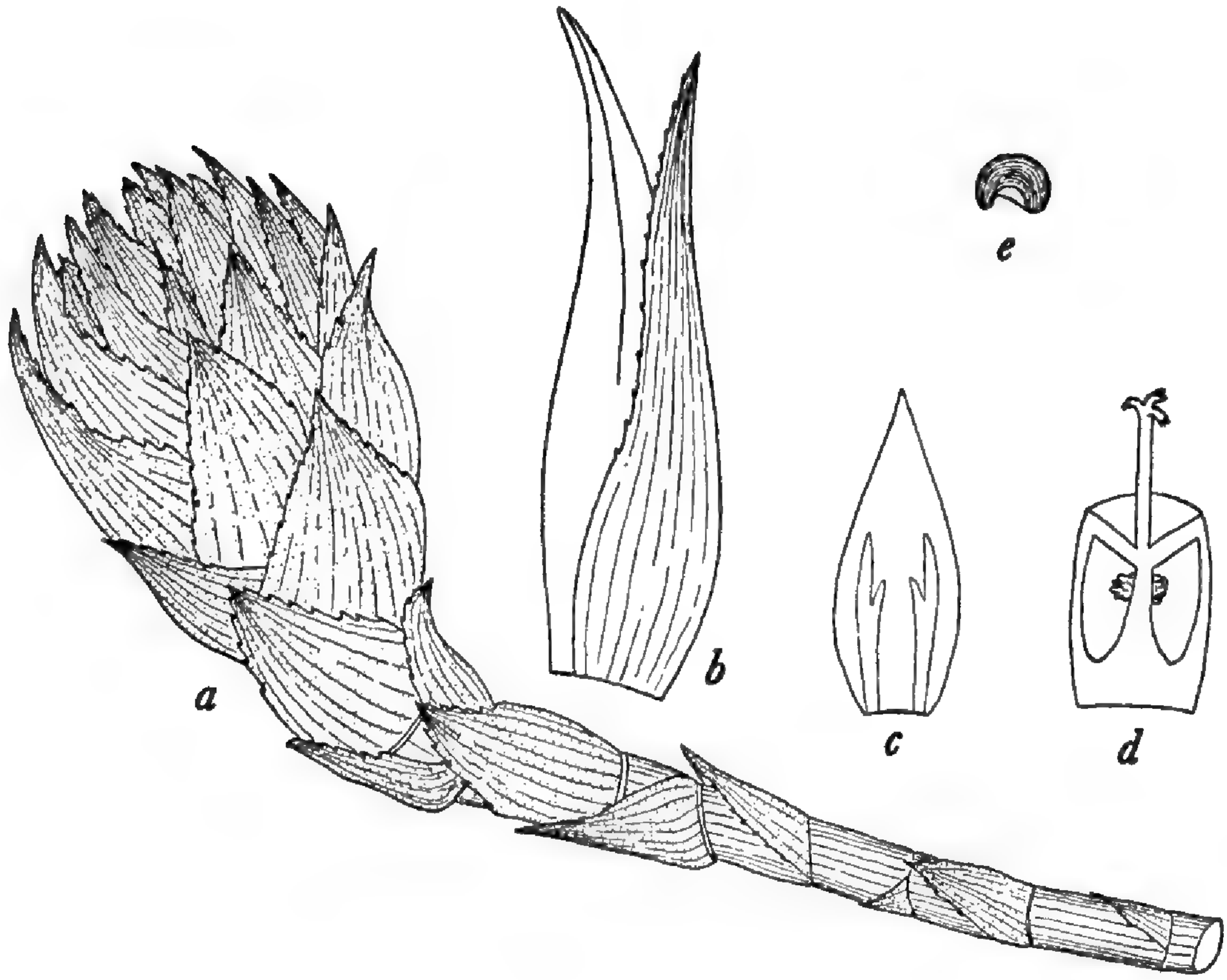

FIGURE 81.—*Aechmea lateralis: a*, Scape and inflorescence, × 1/2; *b*, flower and floral bract, × 1; *c*, petal, × 1; *d*, longitudinal section of ovary, × 1; *e*, seed, × 1. (All after M. B. Foster.)

ECUADOR

Guzmania drewii L. B. Smith, sp. nov. FIGURE 82

A *G. tarapotina* Ule, cui affinis, foliis apice late acutis apiculatisque, spicis patentibus, bracteis florigeris rubris, sepalis obtusis differt.

Known only from fragments, probably about 1 m. high; leaves 5–6 dm. long, green, obscurely punctulate-lepidote, the sheaths elliptic, 15–20 cm. long, the blades ligulate, broadly acute and apiculate, 4–7 cm. wide; scape known only by its apex, 8 mm. in diameter, glabrous, red; scape-bracts erect and densely imbricate, elliptic, apiculate; inflorescence bipinnate, lax except near the apex, 18–48 cm. long; axis flexuous; primary bracts ovate, acute, subchartaceous, red, minutely pale-lepidote especially toward their apices, the lowest about equaling the spikes, the others much shorter; spikes spreading or slightly reflexed, densely ellipsoid, 4–7 cm. long including the short sterile base, 20–25 mm. in diameter; floral bracts erect, imbricate, elliptic, obtuse, cucullate, ecarinate, 20–25 mm. long, exceeding the sepals, chartaceous, nerved, red, sparsely and minutely pale-lepidote; pedicels obconic, stout, 3–5 mm. long; sepals oblong-elliptic, obtuse, 17–20 mm. long, connate for 4–5 mm., strongly nerved,

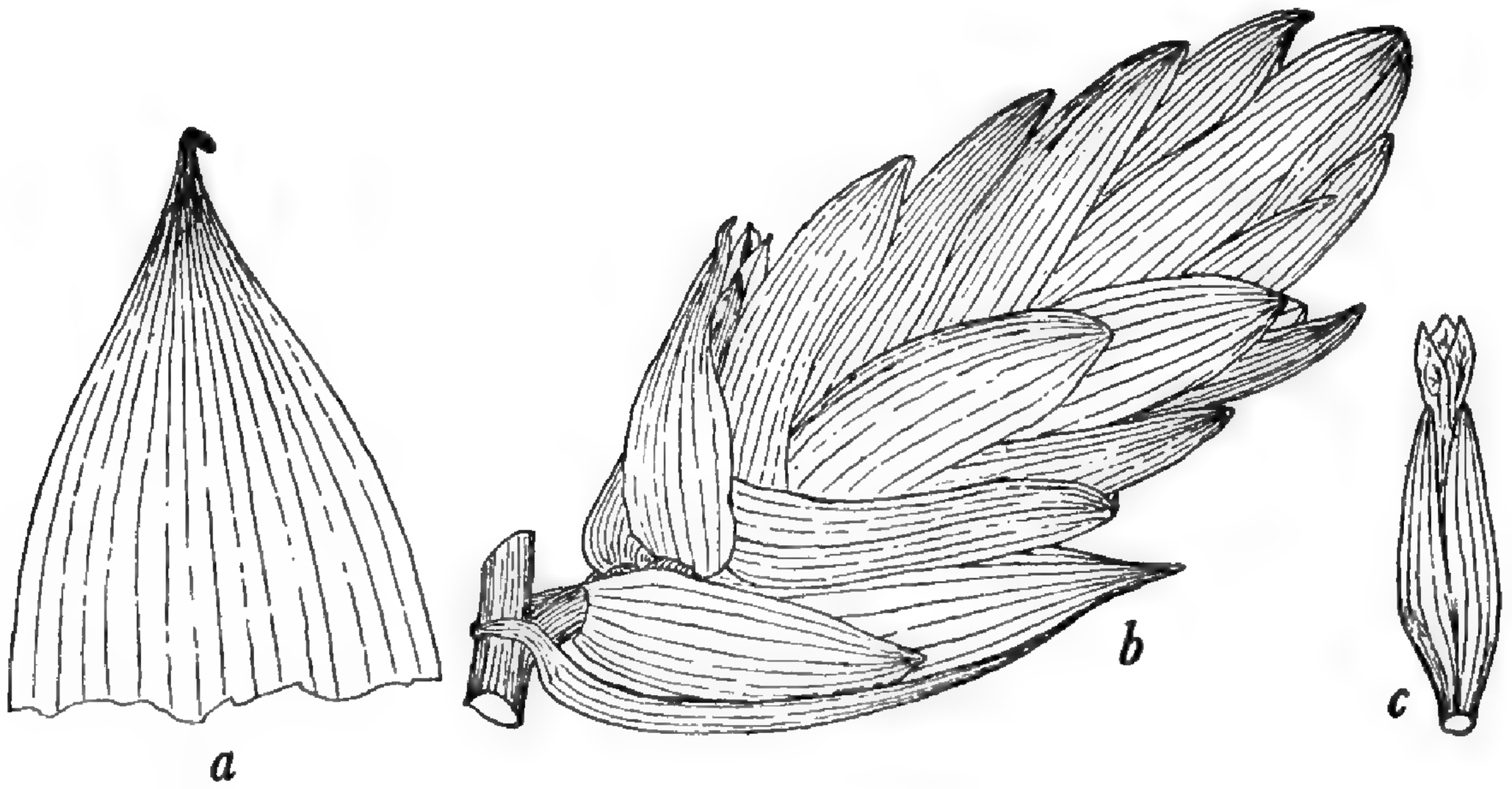

FIGURE 82.—*Guzmania drewii: a*, Apex of leaf, × 1; *b*, branch of inflorescence, × 1; *c*, flower, × 1.

sparsely and obscurely lepidote; petals agglutinated, naked, the blades elliptic, yellow; stamens included.

Type in the U. S. National Herbarium, No. 1995429, collected on stump in wet forest, along trail between Toldadas and Rio Arturo, east of Volcán de Cayambe, Cordillera Oriental, Province of Imbabura, Ecuador, altitude 3,000 meters, May 15, 1944, by W. B. Drew (No. E–198).

ADDITIONAL SPECIMEN EXAMINED:

ECUADOR:

IMBABURA: Epiphyte in rainforest, Camp Arenillas, east of Volcán de Cayambe, alt. 3,120 m., July 21, 1944, *W. B. Drew* E–339 (US).

The second collection of *Guzmania drewii* has smaller leaves and inflorescence and slightly larger flowers than does the type, but it does not differ in essential details.

Tillandsia demissa L. B. Smith, sp. nov. FIGURE 83

A *T. sodiroi* Mez, cui ex descriptione affinis, foliis latioribus, spicis omnibus erectis et multifloris, bracteis florigeris sepalisque majoribus differt.

Caulescent with a branched caudex covered with the remains of old leaves, the flowering shoot 2 m. long when extended; leaves numerous in a spreading rosette at the top of the caudex, 9–12 dm. long, obscurely punctulate-lepidote, the sheaths ample, 3 dm. long, the blades ligulate, flat, acuminate, 10 cm. wide, green; scape decurved, short, hidden by the leaves; scape-bracts subfoliaceous, densely imbricate; inflorescence densely bipinnate, slenderly cylindric, green, glaucous; primary bracts broadly ovate with a foliaceous blade, exceeding the spikes, erect, imbricate; spikes elliptic-oblong, 15 cm. long including the short stout sterile base, 4 cm. wide, strongly complanate, densely

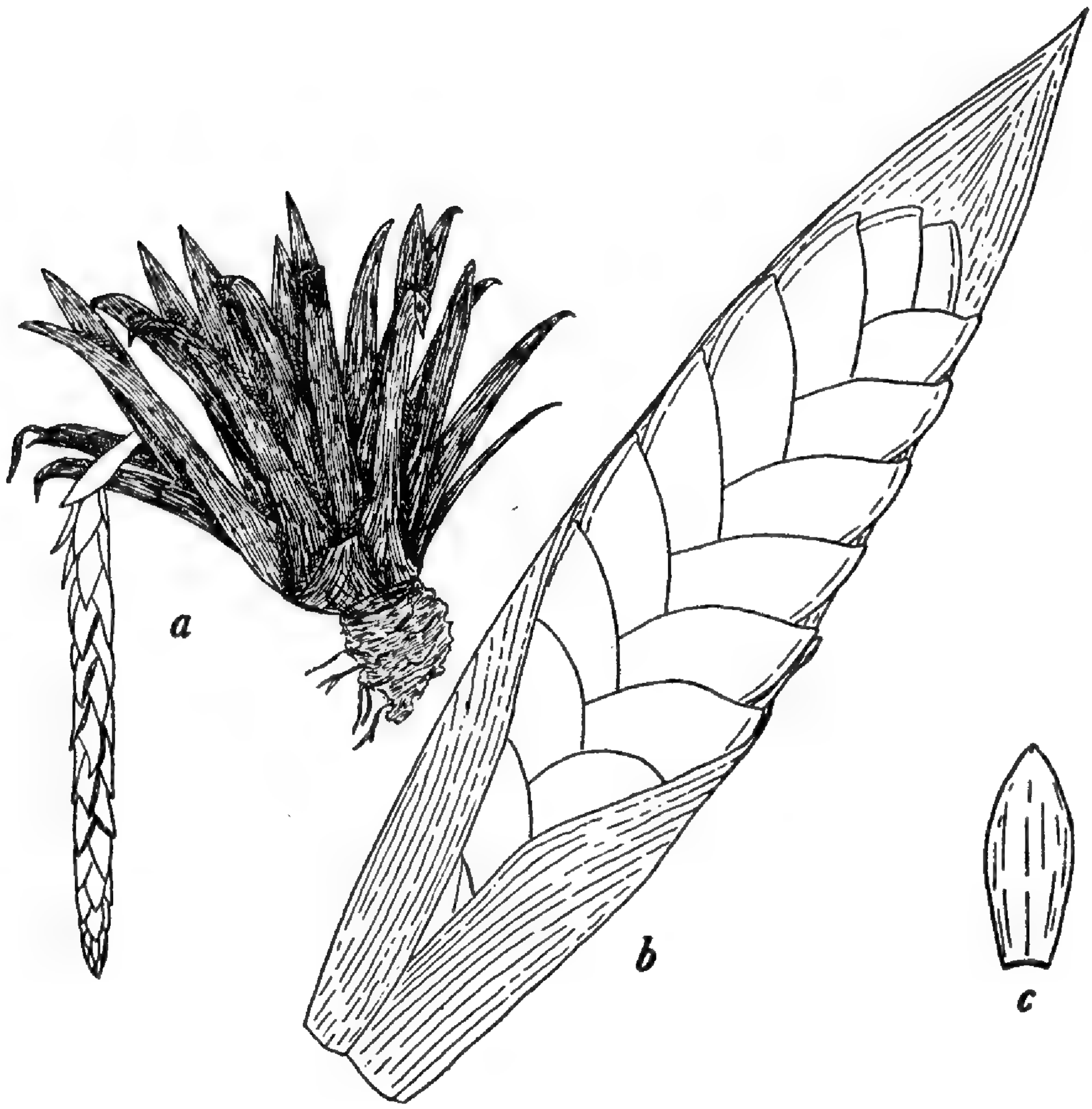

FIGURE 83.—*Tillandsia demissa: a*, Habit, × 1/40; *b*, branch of inflorescence and primary bract, × 1/2; *c*, sepal, × 1/2.

17-flowered; floral bracts suborbicular, equaling the sepals, carinate and minutely incurved at the apex, coriaceous, even; flowers subsessile; sepals elliptic, obtuse, 30 mm. long; petal-blades 15 mm. long, lavender; stamens included.

Type in the U. S. National Herbarium, Nos. 1985901 and 1985902, collected on perpendicular canyon walls, between kilometer 120 and 140 on the road from Oña to Zaraguro, Province of Loja, Ecuador, altitude 1,800–2,100 meters, December 4, 1948, by M. B. Foster (No. 2624).

Tillandsia elegans L. B. Smith, sp. nov. FIGURE 84

A *T. riocreuxii* André, cui affinis, inflorescentia amplissime tripinnata, spicis laxis differt.

Epiphytic, known only from fragments but undoubtedly 1.5-2 m. high; leaf 45 cm. long, densely appressed-lepidote, the sheath large, elliptic, dark castaneous, the blade subtriangular, 4 cm. wide, green,

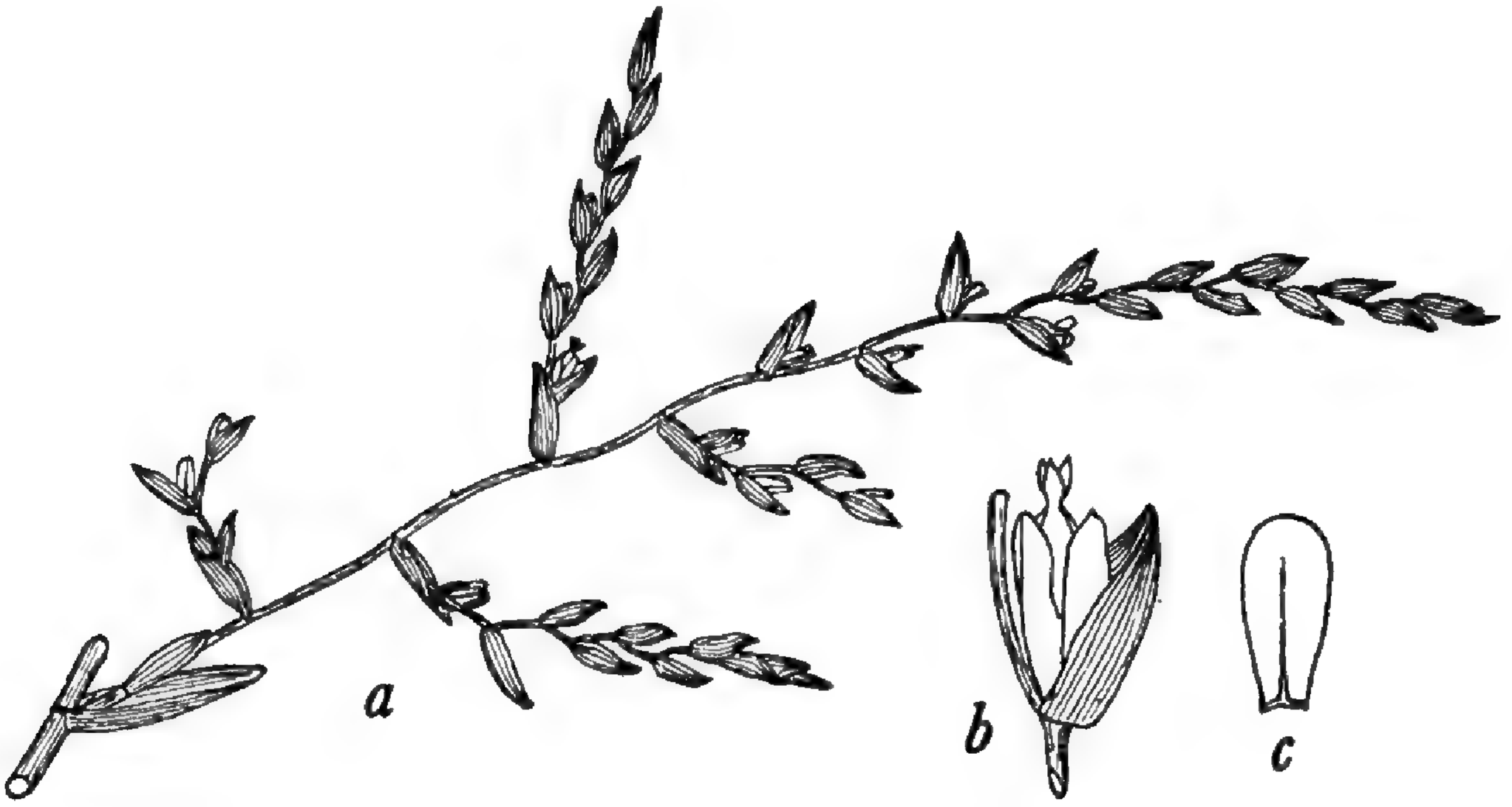

FIGURE 84.—*Tillandsia elegans: a*, Branch of inflorescence, × 1/4; *b*, flower and floral bract, × 1; *c*, sepal, × 1.

pale-lepidote; scape unknown; inflorescence amply and very laxly tripinnate, sparsely pale-lepidote; axis slender, flexuous; primary bracts ovate, 4 cm. long, slightly shorter than the sterile 1-prophyllate bases of the branches, subchartaceous; branches spreading, diffuse, to 30 cm. long; secondary bracts like the primary but much smaller, exceeding the sterile bases of the spikes; spikes lax, the lateral to 10 cm. long, the terminal to 15 cm.; rhachis slender, geniculate; floral bracts divergent, elliptic, acute and minutely incurved, to 13 mm. long on the lateral spikes and 19 mm. on the terminal, exceeding the sepals, about equaling the lower internodes, slightly carinate toward their apices, subchartaceous, faintly nerved; flowers not at all secund; pedicels very short and stout; sepals free, asymmetric, obovate, subtruncate, 7 mm. long, sparsely pale-lepidote; petals white; stamens included.

Type in the U. S. National Herbarium, No. 1995434, collected in rainforest, along trail between Laguna de la Virgen and Camp Arenillas, east of Volcán de Cayambe, Cordillera Oriental, Province of Imbabura, Ecuador, altitude 2,655 meters, July 27, 1944, by W. B. Drew (No. E–391).

Recent collections of *Tillandsia riocreuxii* André show that its inflorescence can vary from wholly bipinnate to tripinnate by the division of a few basal branches as in *T. tristis* Mez which now becomes a synonym of it. However, *T. riocreuxii* is never amply tripinnate like *T. elegans* and its spikes are always dense. The character of secund flowers in *T. riocreuxii* is neither strong nor constant, so it is of no use as a contrast with *T. elegans*.

Tillandsia truncata L. B. Smith, sp. nov. FIGURE 85

A *T. singularis* Mez & Wercklé, cui affinis, foliis multo majoribus, inflorescentia elongata, bracteis florigeris sepala aequantibus differt.

To 8 dm. high; leaves rosulate, 30–55 cm. long, the sheaths ample, 10–15 cm. long, black, covered with a very thin paintlike layer of white scales, the blades ligulate, broadly truncate and apiculate, to 7 cm. wide, obscurely lepidote, red beneath, green above; scape erect, slender, glabrous; scape-bracts elliptic, apiculate, all but the lowest imbricate; inflorescence laxly bipinnate, cylindric, 3 dm. long, glabrous; primary bracts broadly ovate, acute, 2–3 cm. long, always shorter than the spikes, membranaceous, striate, red; spikes suberect, lanceolate, 3–4 cm. long, laxly 11-flowered, short-stipitate, the rhachis slender, geniculate; floral bracts like the primary bracts but obtuse, equaling the sepals, ecarinate; flowers divergent to spreading; sepals oblong, obtuse, 10 mm. long, subequally short-connate; petals greenish or white; stamens included.

Type in the U. S. National Herbarium, No. 1985918, collected on bank along the road between Quito and Santo Domingo [de los Colorados], Province of Pichincha, Ecuador, altitude 1,500 meters, December 8, 1948, by M. B. Foster (No. 2642).

ADDITIONAL SPECIMEN EXAMINED:

ECUADOR:

PICHINCHA: Road between Quito and Santo Domingo, alt. 1,200 m., Dec. 8, 1948, *M. B. Foster* 2644 (US).

PERU

Lindmania aletroides L. B. Smith, sp. nov. FIGURE 86

Statura parva; laminis foliorum parvis, lanceolatis; scapi vaginis minimis, remotis; inflorescentia simplici vel subsimplici; bracteis florigeris pedicellos superantibus; floribus nec nutantibus nec secundis.

Stemless, propagating by basal offsets, the flowering shoot 14–26 cm. high; leaves few, to 9 cm. long, entire, thin, sparsely pale-lepidote when very young, completely glabrous by maturity, the sheaths broadly ovate, about 1 cm. long, the blades lanceolate, flat, acuminate, 12 mm. wide, strongly nerved; scape straight, very slender, sparsely white-flocculose; scape-bracts lanceolate, acuminate, small and remote; inflorescence simple or with a few very short branches at the base, 5–9 cm. long, lax, sparsely white-flocculose; floral bracts ovate, acuminate, exceeding the pedicels; flowers divergent to spreading, not at all secund; pedicels slender, 1 mm. long; sepals ovate, obtuse, nearly 2 mm. long; petals elliptic, obtuse, 5 mm. long, exceeding stamens, white, coiling-recurved at anthesis.

Type in the U. S. National Herbarium, No. 1995359, collected on the border of woods, Sapansachayoc, Province of Paucartambo, Department of Cusco, Peru, altitude 900 meters, July 24–30, 1948, by C. Vargas C. (No. 7358).

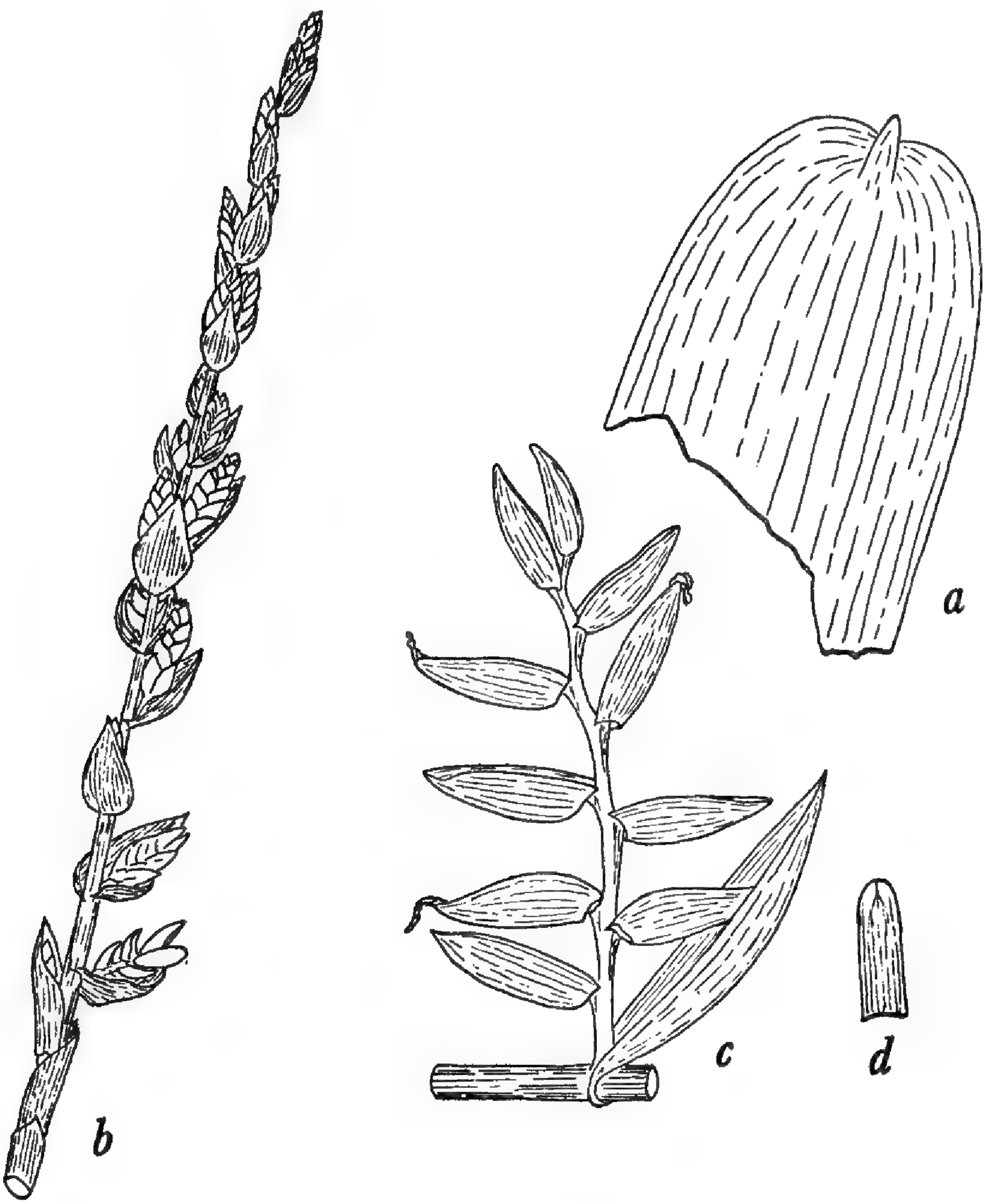

FIGURE 85.—*Tillandsia truncata: a*, Apex of leaf, × 1/2; *b*, young inflorescence, × 1/2 *c*, branch of mature inflorescence, × 1; *d*, sepal, × 1.

The combination of simple or subsimple inflorescence and non-secund flowers removes *Lindmania aletroides* from close relationship with any known species. Also the leaves and scape-bracts are unusually small for the genus.

Pitcairnia sandemanii L. B. Smith, sp. nov. FIGURE 87

Foliis verisimiliter subpetiolatis integrisque; scapi vaginis scapum paulo occultantibus, integris; inflorescentia simplicissima; bracteis florigeris magnis; floribus subsessilibus; ovulis caudatis.

Known only from fragments; leaf-blades linear-lanceolate, long-acuminate, narrowed toward the base, more than 66 cm. long and 2 cm. wide, entire so far as known, white-flocculose above, glabrous

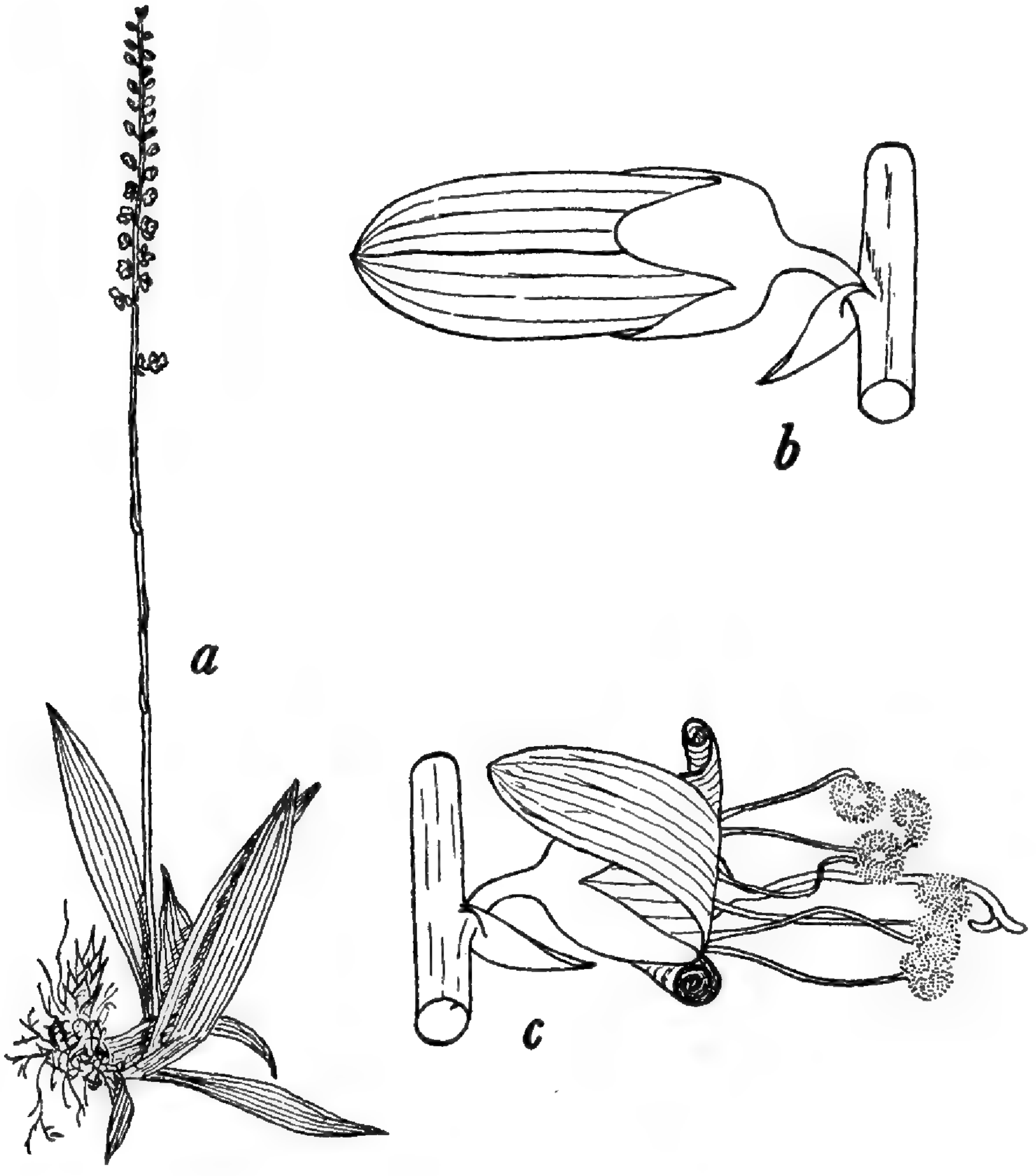

FIGURE 86.—*Lindmania aletroides: a*, Habit, × 1/4; *b*, young flower and floral bract, × 5; *c*, mature flower and floral bract, × 5.

beneath, strongly channeled in the center; scape 3 dm. long, curved, 4 mm. in diameter, white-flocculose; scape-bracts erect, entire, the lower subfoliaceous, the upper broadly ovate, acuminate, shorter than the internodes and exposing the greater part of the scape; inflorescence simple, densely ellipsoid, 8 cm. long, 3 cm. in diameter, sparsely white-flocculose; floral bracts straight, broadly ovate, acuminate, 2 cm. long, much exceeded by the sepals, strongly nerved; flowers subsessile, erect; sepals lance-oblong, acute, 30 mm. long, nerved, the two posterior sepals broadly alate-carinate, the anterior flat, ecarinate; petals to 45 mm. long, bright scarlet (!Sandeman), bearing a large truncate scale at base; stamens included; ovary globose, ¾ superior; ovules caudate.

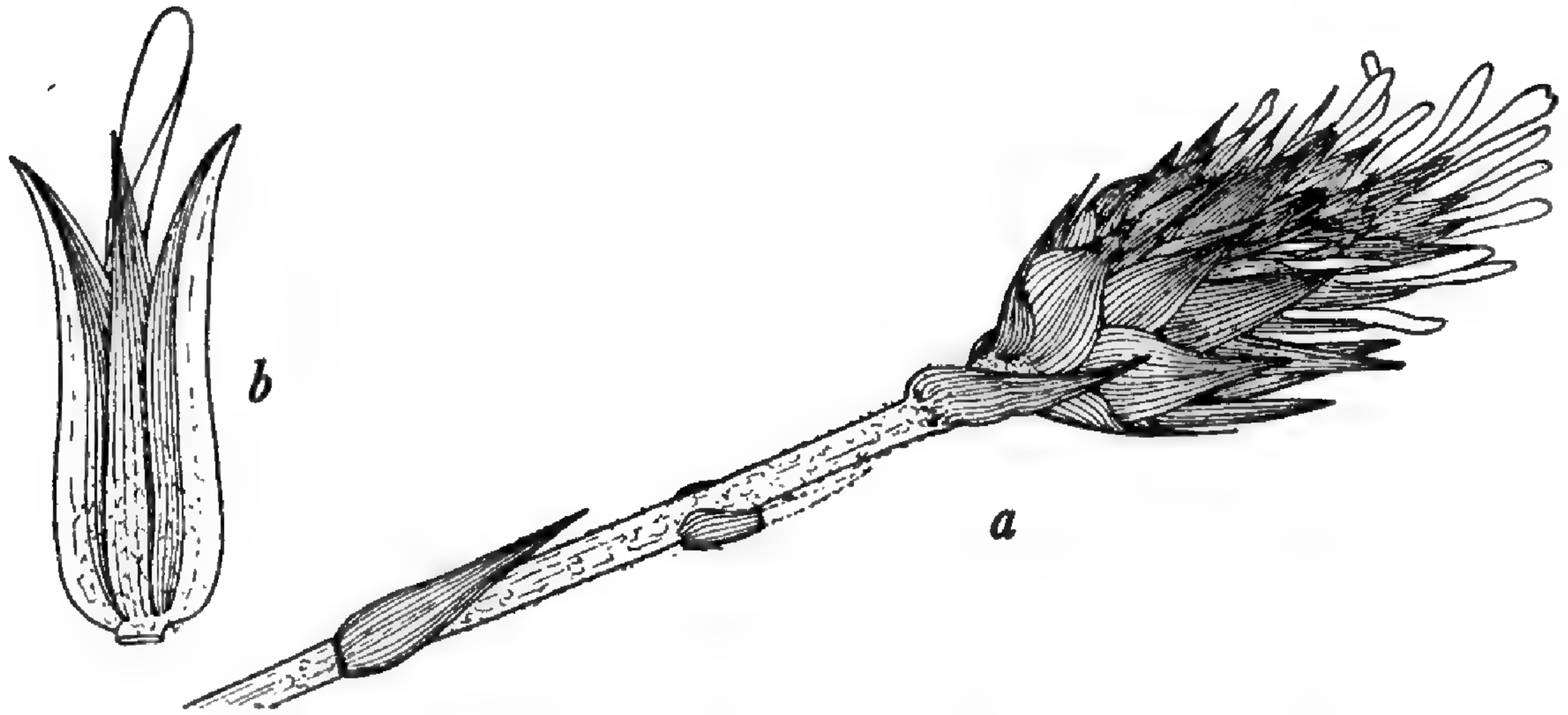

FIGURE 87.—*Pitcairnia sandemanii: a*, Scape and inflorescence × 1/2; *b*, flower, × 1.

Type in the herbarium of the Royal Botanic Gardens, Kew, collected in fully exposed habitat, Huacapistana, Department of Junín, Peru, altitude 1,680 meters, October 7, 1943, by Christopher Sandeman (No. 4586).

Its simple inflorescence, ample floral bracts, and subsessile flowers place *Pitcairnia sandemanii* in the subgenus *Neumannia*. Among its other characters are some so distinctive that it can not be said to show any clear relationship. Its lax scape-bracts are found nowhere else in the subgenus with the possible exception of *P. poeppigiana* whose scape is unknown. Only *P. archeri* resembles it in having floral bracts much shorter than the sepals, and no other species appears to have such broadly alate posterior sepals.

Puya cerrateana L. B. Smith, sp. nov. FIGURE 88

A *P. lanuginosa* (R. & P.) Schult. fil., cui valde affinis, bracteis florigeris elongatis, acuminatis, sepala superantibus, per anthesin recurvatis differt.

Flowering plant 1–1.5 m. high; leaves 7 dm. long, the sheaths elliptic, 9 cm. long, mostly glabrous, the blades linear-triangular, 3–4 cm. wide, glabrous above, beneath covered with fine white appressed scales, laxly armed with red-brown uncinate spines 7 mm. long; scape 18 mm. in diameter, glabrous at anthesis; scape-bracts quickly deciduous, unknown; inflorescence simple, densely cylindric, 35 cm. long, 7 cm. in diameter; floral bracts ovate, acuminate, to 5 cm. long, exceeding the sepals but with the upper half coiling-reflexed at anthesis, entire, covered with a short-lanose dusty white tomentum outside, glabrous and nearly black inside; pedicels obconic, 10 mm. long, lanate; sepals elliptic, broadly acute, 35 mm. long, ecarinate, lanate outside; petals 56 mm. long, naked, olive green turning to brown: stamens slightly exserted; ovary superior, ovules winged.

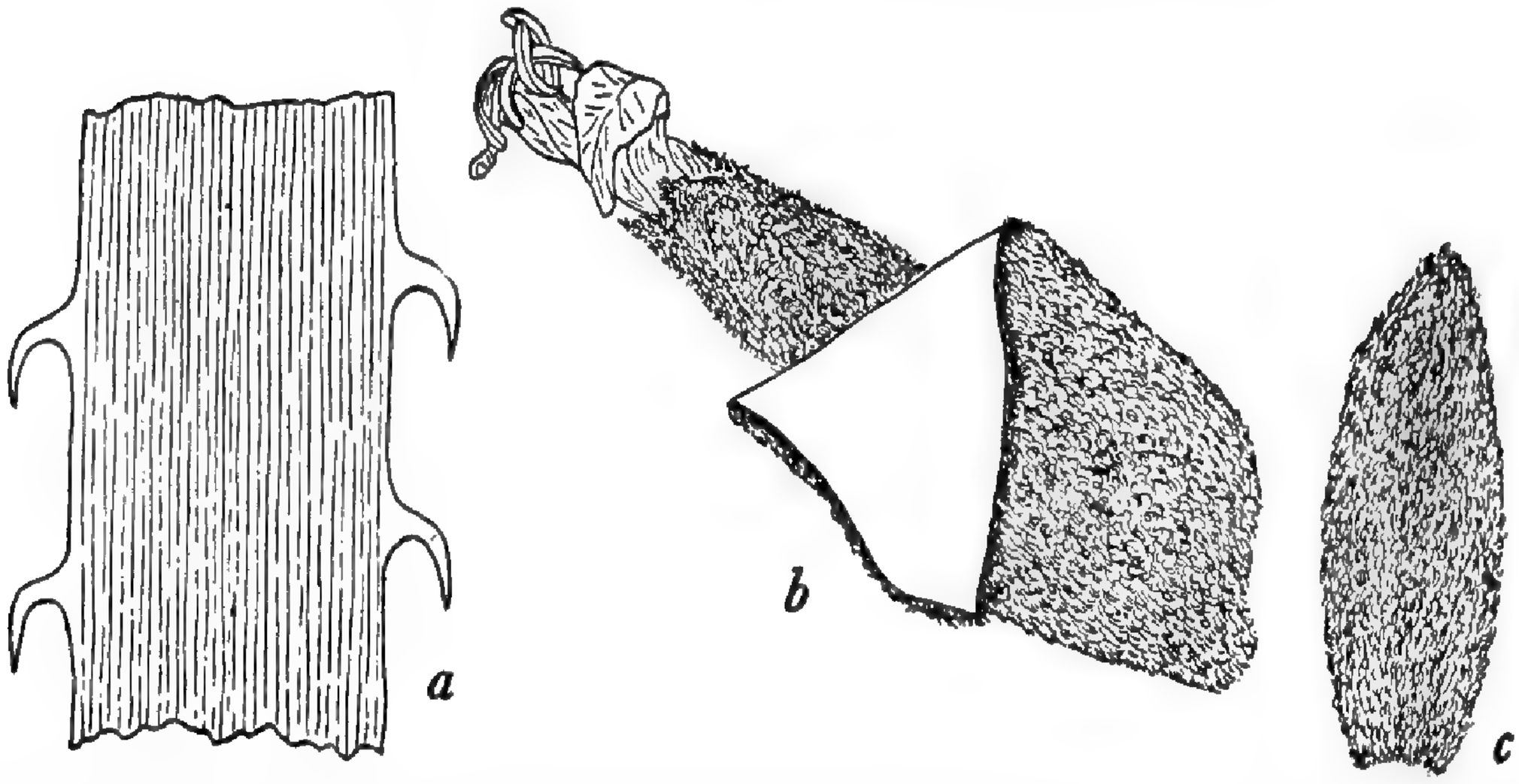

FIGURE 88.—*Puya cerrateana: a*, Section of leaf-blade, × 1; *b*, flower and floral bract, × 1; *c*, sepal, × 1.

Type in the U. S. National Herbarium, Nos. 2027896 and 2027897, collected on rocky ground, Cashapata, near Chiquián, Province of Bolognesi, Department of Ancash, Peru, altitude 3,560 meters, August 5, 1949, by Emma Cerrate (No. 369).

This species must present a striking picture in the field with its slender white inflorescence checked with green petals and dark brown bract-tips.

Tillandsia cacticola L. B. Smith, sp. nov. FIGURE 89

A *T. straminea* H. B. K., cui affinis, inflorescentia lepidota, bracteis florigeris sepala valde superantibus, petalis aureis differt.

Type stemless and 15 cm. high (collector notes that species grows much larger); leaves numerous, spreading, 8 cm. long, covered with coarse subspreading cinereous scales, the sheaths indistinct, the blades linear-triangular, subulate-acuminate, 1 cm. wide; scape slender, curved; scape-bracts imbricate, closely involute about the scape, densely lepidote, caudate at the apex; inflorescence digitate from 3 spikes; primary bracts elliptic, acute, more than half as long as the spikes, thin, lepidote; spikes subsessile, broadly elliptic, strongly compressed, 3 cm. long, 2 cm. wide, subdensely 5-6-flowered; rhachis geniculate, slender, lepidote; floral bracts many times longer than the internodes but exposing most of the rhachis, elliptic, acute, to 20 mm. long, exceeding the sepals, membranaceous, sparsely lepidote, carinate, incurved at apex; sepals lanceolate, acute, 16 mm. long, very sparsely lepidote, connate posteriorly for 1 mm.; petals yellow, the blades spreading, suborbicular, 6 mm. long; stamens deeply inculuded, exceeding the pistil.

Type in the herbarium of the Royal Botanic Gardens, Kew, collected on cacti, at Huancabamba, Department of Piura, Peru, altitude 1,800 meters, August 1943, by Christopher Sandeman (No. 4325).

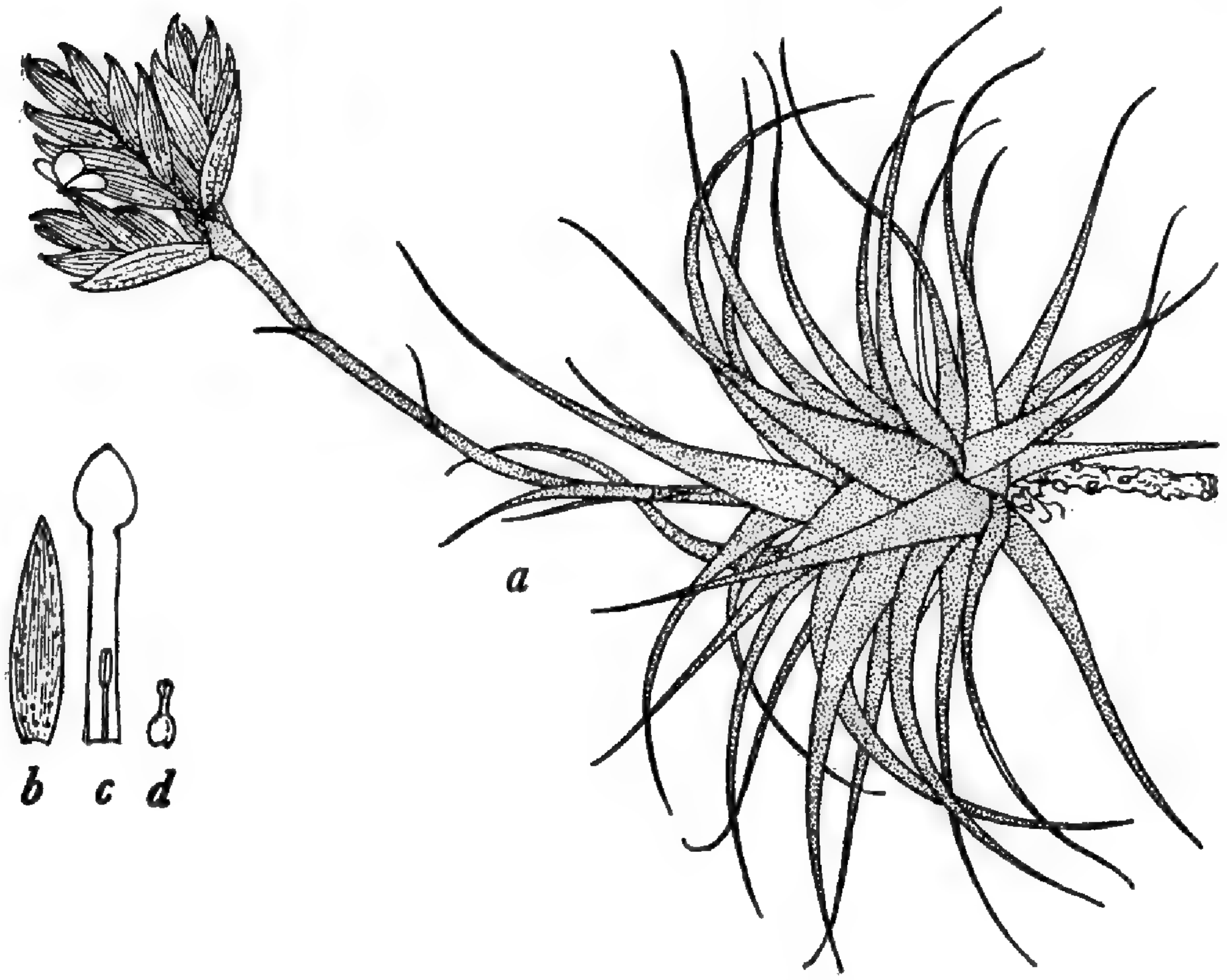

FIGURE 89.—*Tillandsia cacticola: a*, Habit, × 1/2; *b*, sepal, × 1; *c*, petal and stamen, × 1; *d*, pistil, × 1.

In his first monograph, Mez placed *Tillandsia straminea* under the subgenus *Anoplophytum*, then shifted it to *Allardtia* in his treatment in the Pflanzenreich. Actually its flowers with their deeply included stamens, straight filaments, and very short pistil, are quite typical of the subgenus *Phytarrhiza*. *T. cacticola* has yellow petals according to the collector yet they turn partially blue in drying, so that they are a close match for faded ones of *T. straminea* in the herbarium.

BOLIVIA

Deuterocohnia strobilifera Mez var. inermis L. B. Smith, var. nov.

A var. *strobilifera* foliis omnino inermibus differt.

Differs from the typical variety in its entire leaves.

Type in the U. S. National Herbarium, No. 1986011, collected on rocky slopes, near Sivingamayu, Province of Cinti, Department of Chuquisaca, Bolivia, altitude 3,400 meters, February 1949, by M. Cárdenas (No. 4094).

ADDITIONAL SPECIMENS EXAMINED:

BOLIVIA:

POTOSÍ: Forming hilly mounds 1–2 meters in diameter and 60 cm. high, on dry rocky slopes associated with cacti, between Oploca and Atocha, alt. 3,000 m., Dec. 1946, *M. Cárdenas* 3741 (GH, US).

TARIJA: On barren gravelly canyon slopes, with *Oreocereus celsianus*, other cacti and xerophytic bushes, Quebrada Tenalpa, 20 km. east of Villazón on road to Tarija, alt. ca. 3,400 m., Feb. 12, 1937, *J. West* 8379 (GH).

The most recent collection was chosen as the type because its more mature flowers show the appendage on the petals most clearly.

Puya atra L. B. Smith, sp. nov. FIGURE 90

Inflorescentia bipinnata, stellato-tomentosa, mox glabra; ramis dense ellipsoideis, stipitatis, bracteas primarias lucidas aterrimas superantibus; bracteis florigeris late rotundatis, sepala superantibus.

Caulescent with a caudex like that of *Yucca aloifolia* (! Foster), the flowering shoot over 2 m. high; leaves 6 dm. long, very soon glabrous,

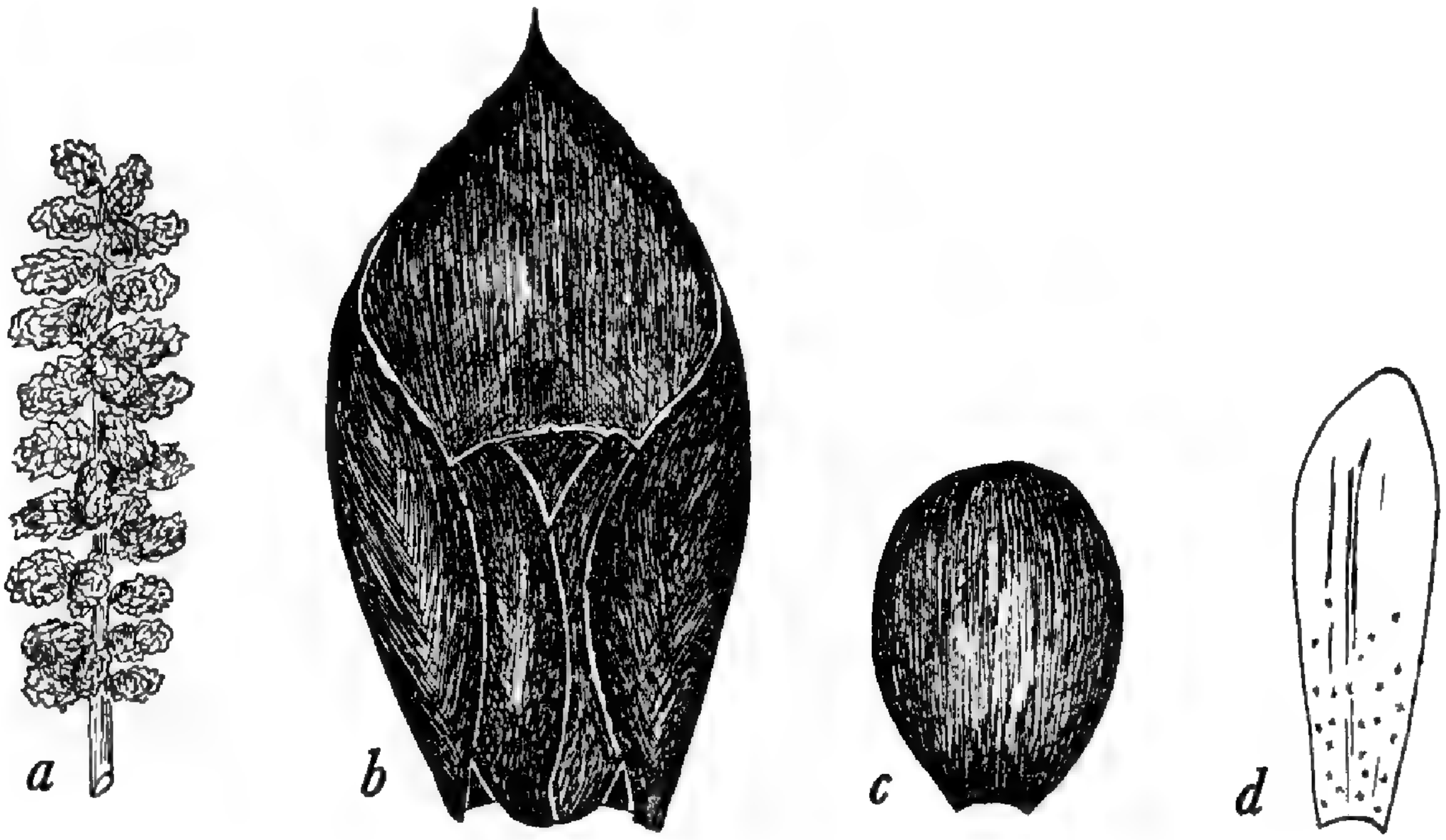

FIGURE 90.—*Puya atra: a*, Mature inflorescence, × 1/20; *b*, branch of very young inflorescence and primary bract, × 1/2; *c*, floral bract, × 1/2; *d*, sepal, × 1.

the sheaths suborbicular, 6 cm. long, castaneous and serrulate toward the apex, the blades linear-triangular, acuminate, pungent, laxly armed with dark mostly ascending spines 5 mm. long; scape erect, about 2 cm. in diameter, tomentose-lepidote, very quickly glabrous; scape-bracts densely imbricate, subfoliaceous, the blades subdensely lepidote above with fine irregular white scales; inflorescence densely bipinnate, covered with fine stellate ferruginous scales, soon glabrous; primary bracts broadly ovate, acute, 8 cm. long, even or faintly striate, black, lustrous; branches spreading to slightly deflexed, ellipsoid, 9–10 cm. long exclusive of the short stout sterile base, 5–6 cm. in diameter; floral bracts imbricate, very broadly elliptic, obtuse, 4 cm. long, exceeding the sepals, sparsely and very minutely serrulate, subchartaceous, black, lustrous; pedicels slenderly cylindric, 8 mm.

long; sepals narrowly elliptic, obtuse, 26 mm. long, carinate, lustrous; ovary wholly superior; seeds winged.

Type in the U. S. National Herbarium, Nos. 1985813 and 1985814, collected in cloud forests above Yungas, Department of Cochabamba, Bolivia, altitude 3,150 meters, November 13, 1948, by M. B. Foster (No. 2551).

It is not possible to indicate any real affinity for *Puya atra*. In the Pflanzenreich key it comes out to *P. venusta* Philippi, a dwarf Chilean species with a lax few-branched inflorescence. Its inflorescence has much more the outline of that of *P. weberbaueri* Mez, but that species has dull bracts and a pale long-lanate indument as well as sessile spikes.

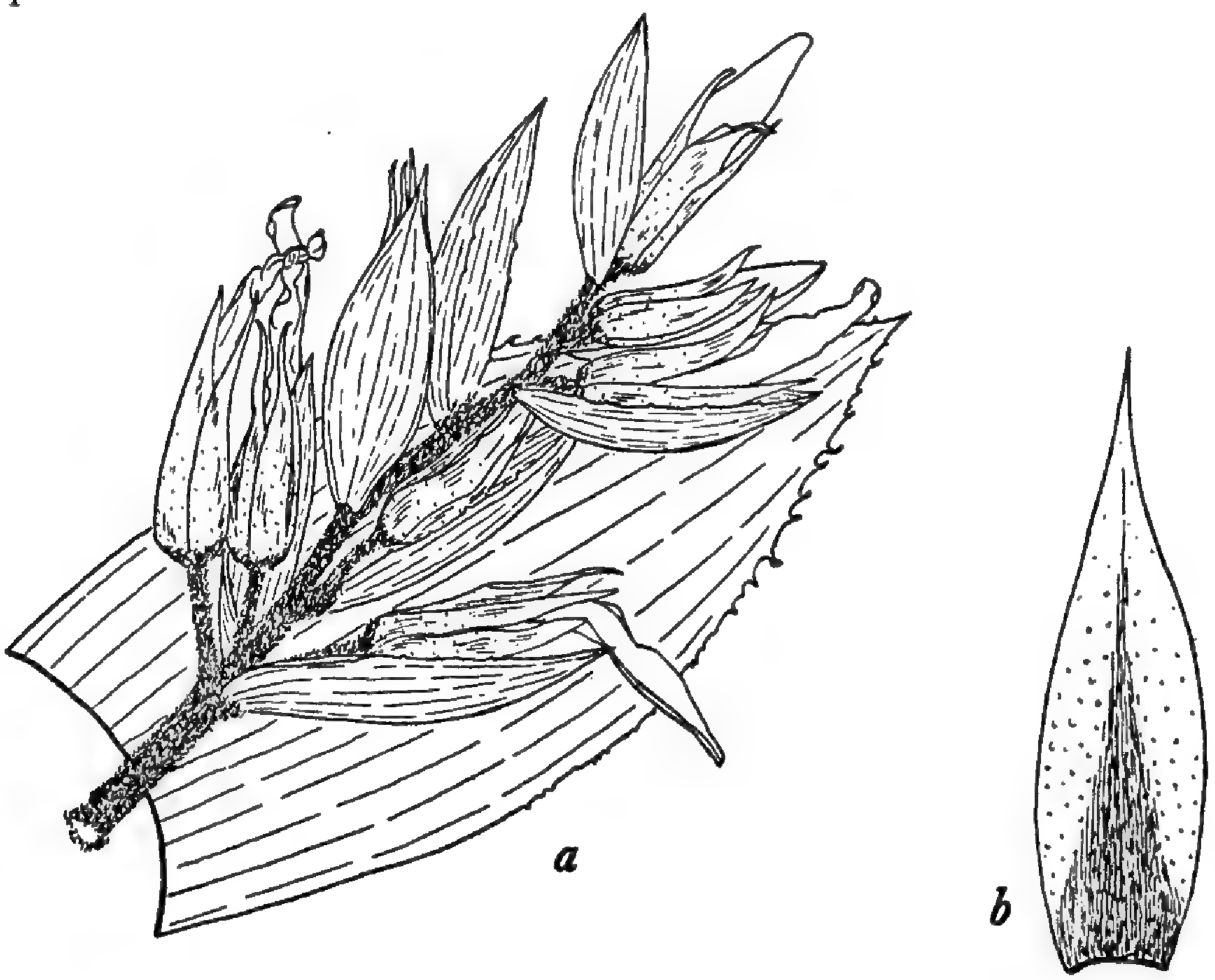

FIGURE 91.—*Puya glabrescens: a*, Branch of inflorescence and primary bract, × 1/2; *b*, sepal, × 1.

Puya glabrescens L. B. Smith, sp. nov. FIGURE 91

Planta mediocris; inflorescentia bipinnata, dense cylindrica; bracteis sepalisque mox glabris; bracteis primariis magnis, ramos aequantibus, serratis; bracteis florigeris sepala subaequantibus, serrulatis; sepalis acuminatis.

Flowering plant 6–8 dm. high (! Cárdenas); leaves 4–7 dm. long, the sheaths suborbicular, 5–9 cm. wide, the blades linear, acuminate, 2–3 cm. wide, at first covered on both sides with gray appressed scales, laxly serrate with slender hooked teeth 10 mm. long; scape erect,

shorter than the leaves, stout; inflorescence bipinnate, densely cylindric, densely and finely white-lanate with the bracts and sepals soon becoming glabrous; primary bracts elliptic, ample, acute, to 13 cm. long, equaling the branches, serrate; floral bracts elliptic, acute, about equaling the sepals, serrulate; pedicels slender, to 16 mm. long; sepals lance-ovate, acuminate, much thickened centrally but not winged, 35 mm. long, coriaceous; petals 55 mm. long, naked, purple.

Type in the U. S. National Herbarium, Nos. 1986196 and 1986197, collected on rocky slopes, Llallaguani to Anzaldo, Department of Cochabamba, Bolivia, altitude 3,000 meters, January 1949, by M. Cárdenas (No. 4384).

The following, although it has somewhat smaller flowers and yellowish green petals, does not appear to be specifically different:

BOLIVIA:

COCHABAMBA: On rocky slopes, Llallaguani to Anzaldo, alt. 3,000 m., Jan. 1949, *Cárdenas* 4383 (US).

The flowers of *Puya glabrescens* are similar to those of *P. meziana* but the inflorescence is compound and the floral bracts are large and serrulate.

Puya olivacea Wittm. Mededeel. Rijks Herb. Leiden **29**: 83. 1916. FIGURE 92

Pitcairnia olivacea Mez in Engl. Pflanzenreich IV. **32**: 247. 1935.

Emended description: Flowering plant to 1.5 m. high; leaves 9 dm. long, pale-lepidote, becoming glabrous, the sheaths ovate, small, the blades linear, acuminate, 3–4 cm. wide, laxly armed with dark slender spines 5 mm. long; scape elongate, glabrous; scape-bracts soon disintegrating, broadly ovate; inflorescence amply paniculate, lax, olivaceous-glaucous covered with fine white stellate trichomes when young; primary bracts suborbicular, apiculate, 4 cm. long, exceeding the short sterile naked bases of the branches, serrate, subchartaceous, soon disintegrating; branches divergent, simple, laxly few-flowered, 10–12 cm. long; floral bracts elliptic, apiculate, 3 cm. long, equaling or exceeding the slender pedicels, serrulate; sepals lanceolate, obtuse and mucronulate, 35–40 mm. long, thickened at the base but not carinate; petals 60–70 mm. long, naked, pale lilac; stamens included; ovary wholly superior, ovules broadly winged.

TYPE LOCALITY: Quebrada de Charagua, Bolivia.

BOLIVIA:

SANTA CRUZ: Prov. Cordillera: Quebrada de Charagua, alt. 950 m., Dec. 1910, *Herzog* 1216 (L, type; B, Macbride photo No. 11412). On sandstone hills. near Lagunillas, alt. 1,050 m., Feb. 1951, *Cárdenas* 4786 (US).

The Cárdenas specimen, which is from near the type locality, agrees closely with the type of *Puya olivacea* and gives additional information on the species by its well preserved primary and floral

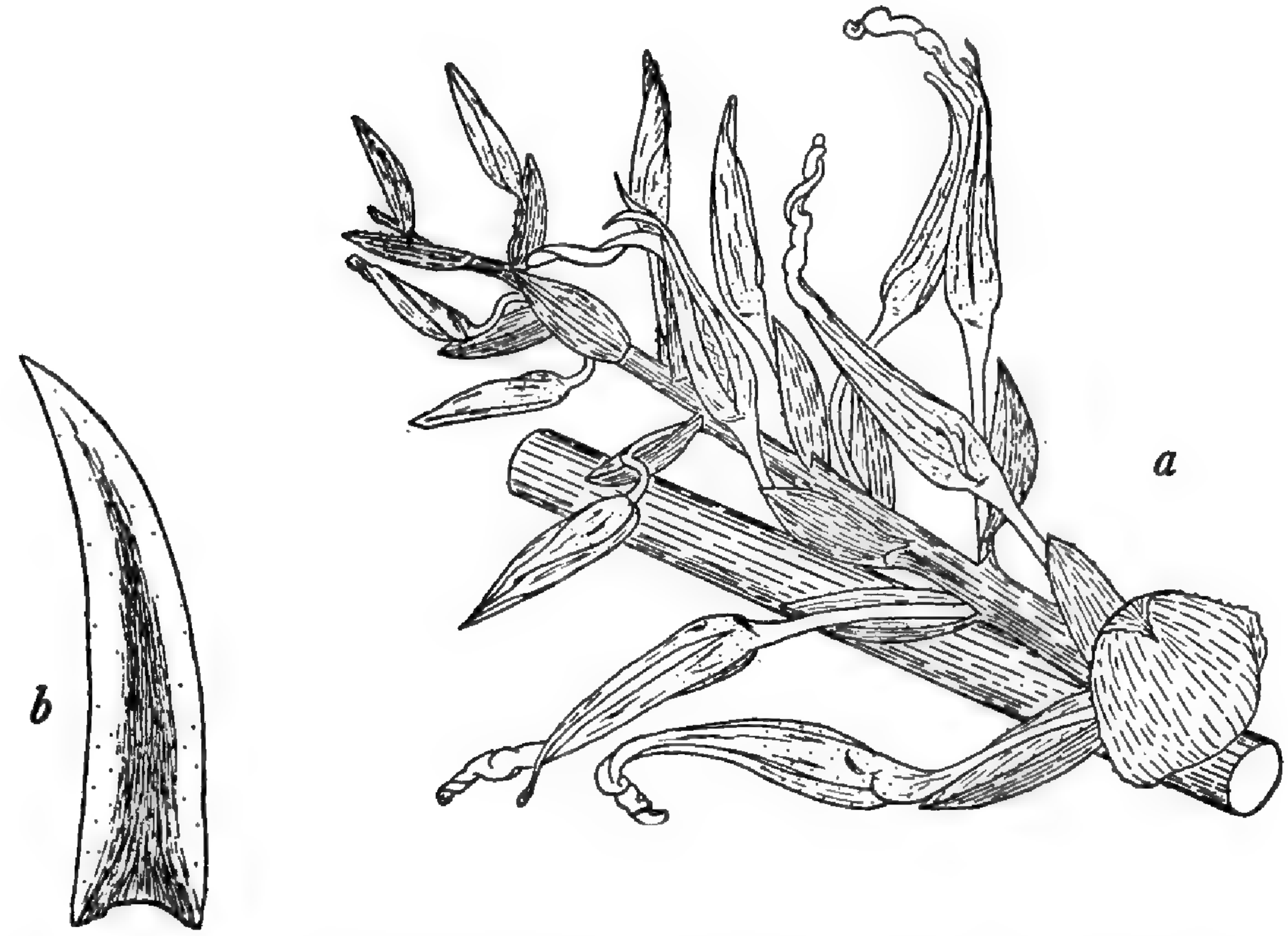

FIGURE 92.—*Puya olivacea: a*, Branch of inflorescence and primary bract, × 1/2; *b*, sepal, × 1.

bracts. Mez gives no explanation for his transfer of the species to *Pitcairnia* and his description gives only characters that would place it in *Puya* by his own definition of the genus. The flowers are very similar to those of *Puya hofstenii* Mez.

Puya tuberosa Mez in DC. Monogr. Phan. **9**: 483. 1896. FIGURE 93

Emended description: Flowering plant less than 3 dm. high including the very short erect rhizome; leaves 15–30, the sheaths suborbicular, blackish brown, pale-lepidote, forming a globose bulb 3 cm. in diameter, the blades linear, flexuous, filiform-acuminate, 15–18 cm. long, 2–3.5 mm. wide, glabrous above, covered with pale narrow spreading scales beneath, laxly armed with fine spreading or ascending spines 1–2 mm. long; scape erect, slender, white-flocculose becoming glabrous; scape-bracts ovate with long filiform blades, covering relatively little of the scape, pale-lepidote; inflorescence simple or with a few short branches at base, cylindric, 7–10 cm. long, white-flocculose at first; primary bracts ovate, acuminate, 2 cm. long, longer or shorter than the laxly few-flowered branches, minutely serrulate; floral bracts ovate, acute, thin, red; pedicels slender, 4–7 mm. long, longer or shorter than the floral bracts; sepals lance-oblong, acute, 7-9 mm. long; petals 14 mm. long, blue-violet.

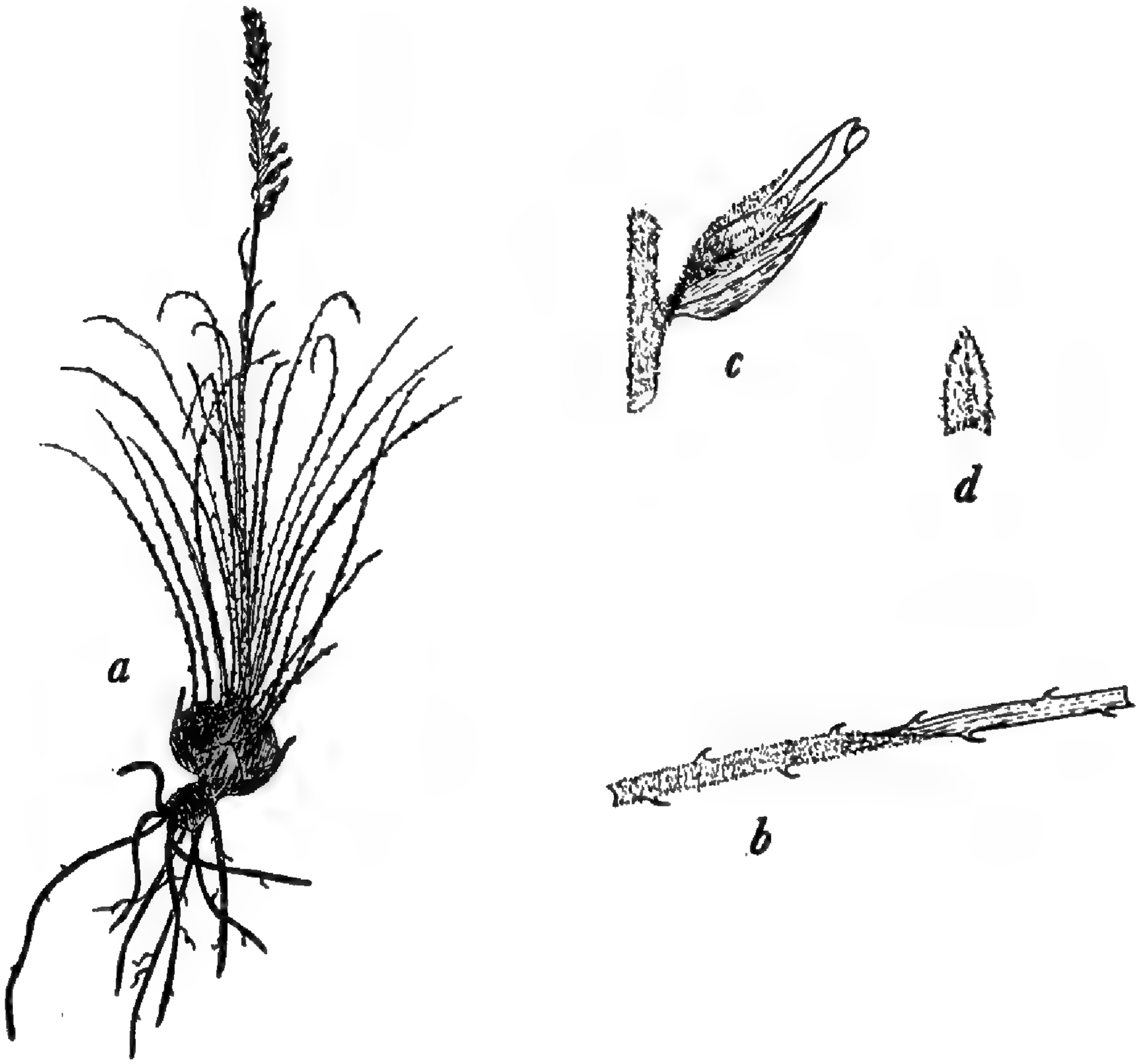

FIGURE 93.—*Puya tuberosa:* *a*, Habit, × 1/5; *b*, section of leaf-blade, × 1; *c*, flower and floral bract, × 1; *d*, sepal, × 1.

TYPE LOCALITY: "Peru".

BOLIVIA: *Haenke* (M, type).

SANTA CRUZ: Among grasses on rocky slopes, near Cuesta de Monos, alt. 1,000 m., Nov. 1950, *Cárdenas* 4647 (US).

There has been considerable confusion in the labels of Haenke's plants. Also, Haenke collected in central Bolivia. These facts and the restricted range of nearly all species of *Puya* make it seem very likely that the Cárdenas plant comes from close to the type locality. The type lacks all but the base of the inflorescence and is in fruit. Except for longer pedicels, perhaps attributable to age, it agrees closely with the Cárdenas material.

Puya ultima L. B. Smith, sp. nov. FIGURE 94

A *P. pearcei* (Baker) Mez, cui habitu simillima, ramis longissimis, bracteis florigeris pectinato-serratis, sepalis valde carinatis differt.

Flowering plant to 1.5 m. high; leaves 9 dm. long, covered with white appressed scales beneath, becoming wholly glabrous, the sheaths distinguishable only by their shorter teeth and dark castaneous coloration,

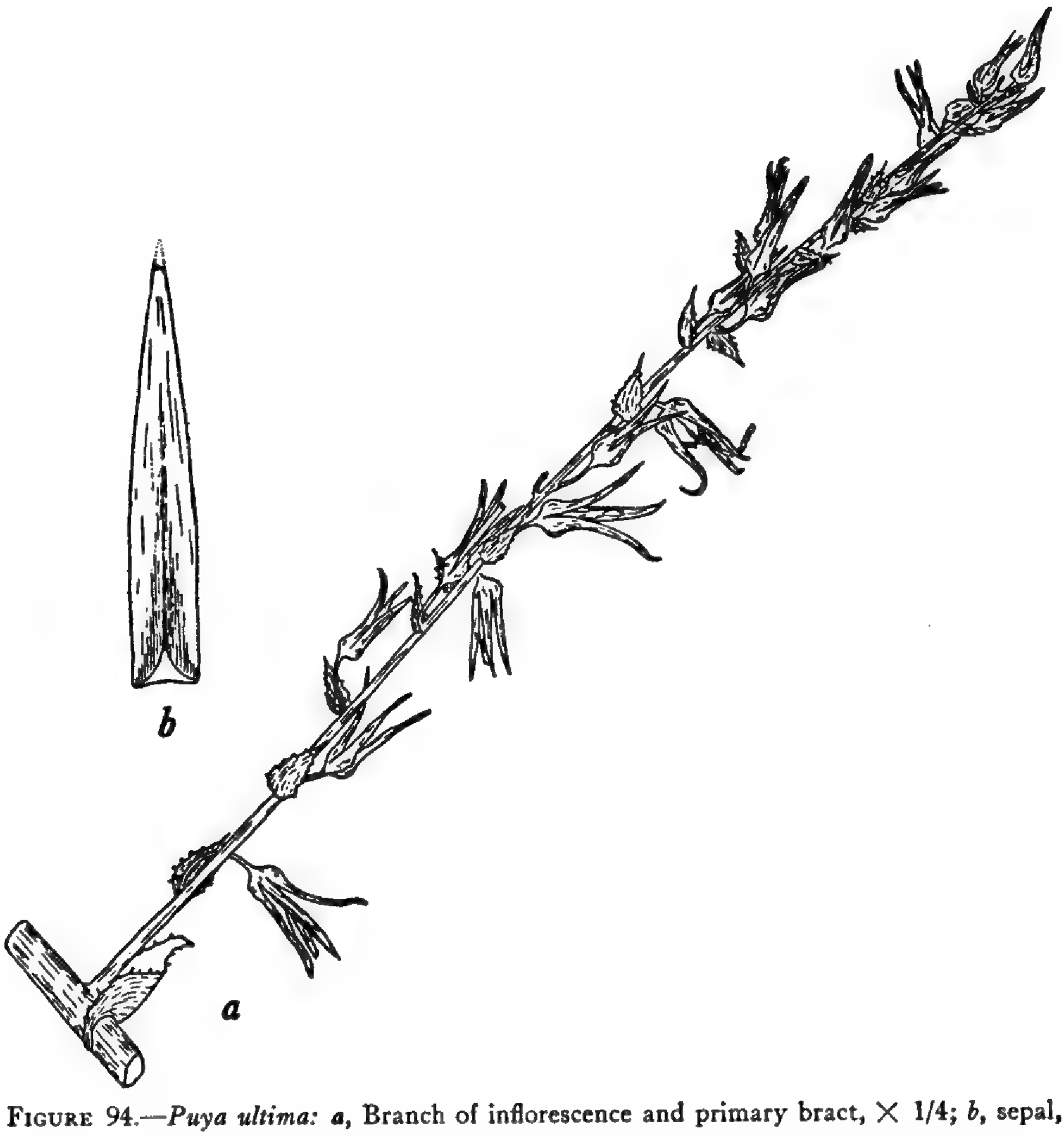

FIGURE 94.—*Puya ultima:* ***a***, Branch of inflorescence and primary bract, × 1/4; *b*, sepal, × 1.

the blades linear-triangular, acuminate, pungent, 6 cm. wide, laxly armed with black broad ascending spines 10 mm. long; scape unknown; inflorescence bipinnate, ample, very lax, glabrous at least after anthesis; primary bracts broadly ovate, acuminate, 5 cm. long, about equaling the sterile naked bases of the branches, pectinate-serrate, subchartaceous; branches spreading, slender, 5 dm. long, laxly flowered especially toward the base; floral bracts ovate, acuminate, 2 cm. long, equaling or exceeding the slender pedicels, pectinate-serrate; flowers ascending; sepals narrowly triangular, strongly carinate, at least 40 mm. long, their apices unknown; petals naked; ovary superior; seeds winged.

Type in the U. S. National Herbarium, Nos. 1985832 and 1985833, collected on humid rocky slopes, eastern slope of the Eastern Cordillera, on the road to Irupana, east of La Paz, Department of La Paz, Bolivia, altitude 1,500 meters, November 20, 1948, by M. B. Foster (No. 2575).

Owing to the absence of complete sepals in *Puya ultima* it is not possible to place it exactly in reference to Mez's treatment in the Pflanzenreich. None of the species with blunt sepals have such strongly serrate floral bracts, and those with acute or acuminate sepals and pectinate bracts, such as *P. roezlii* E. Morr., have little resemblance to *P. ultima*. *Puya ultima* is extreme in three characters, its long branches, pectinate bracts, and carinate sepals, hence the specific name.

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NOTES ON SOME BRAZILIAN AND OTHER LEGUMINOSAE

By ARTURO BURKART

UNITED STATES
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PREFACE

Dr. Arturo Burkart, Director of the Instituto de Botánica Darwinión, Dirección General de Cultura, Ministério de Educación, San Isidro, Argentina, for many years has been publishing studies of South American Leguminosae in his own journal, "Darwiniana." He has kindly submitted these notes here because they involve, almost equally, the correct designation of material of Darwinión and of the U. S. National Herbarium.

JASON R. SWALLEN,
Head Curator, Department of Botany,
United States National Museum.

NOTES ON SOME BRAZILIAN AND OTHER LEGUMINOSAE

By Arturo Burkart

INTRODUCTION

Through the courtesy of Dr. Lyman B. Smith of the U. S. National Herbarium, I have received an interesting collection of Brazilian Leguminosae for identification. In addition, studies have been made for several years of large Brazilian collections in the Darwinión herbarium sent to the writer by Father B. Rambo (Pôrto Alegre, Rio Grande do Sul), Father R. Reitz (Itajaí, Santa Catarina), Dr. Amaro Macedo (Ituiutaba, Minas Gerais), and other correspondents. Some nomenclatorial results of these studies already have been published in previous papers in "Darwiniana" while others are published here for the first time. The principal aim of this paper is to establish correct specific epithets according to priority as established in the "International Code of Botanical Nomenclature" (1956).

Mimosa vellosiella Herter, Rev. Sudam. Bot. 6:151. 1940; Burkart, Darwiniana 8:94. 1948.

Mimosa cinerea Vell. Fl. Flumin. Icones 11:*pl. 35*. 1835(real date; cf. O. Kuntze, Rev. Gen. Pl. 1:cxlv. 1891); text edit. L. Netto, Archivos Mus. Nac. Rio de Janeiro 5:438. 1881, non L. 1753.

BRAZIL:

Rio de Janeiro: Cabo Frio, Praia do Pontal, near sea level, *L. B. Smith* 6610, 6615 (US).

The specimens are interesting because they must represent the typical variety of this taxon, based on *Mimosa cinerea* Vell. from Rio de Janeiro (Vellozo's "Flora Fluminensis" treats especially this state). There are no type specimens known of Vellozo's species. This typical variety (var. *vellosiella*) is a creeping shrubby perennial with adventitious roots on the lower internodes. It becomes blackish in the herbarium and the loment is smaller and less setose, its articles being rectangular and much broader than long (3–5 mm. long, 10 mm. broad). The plant of Argentina, Paraguay, and perhaps southern Brazil, which I described in 1948 (loc. cit.) probably merits varietal recogni-

tion, as it does not blacken, and has larger leaves and loments with larger segments.

Cassia australis Vell. Fl. Flumin. 166. 1825; text edit. L. Netto, Archivos Mus. Nac. Rio de Janeiro 5:159. 1881; Vell. Icones 4:*pl.65*. 1835 (real date, cf. supra, not "1827").

Cassia appendiculata Vogel, Linnaea 11:670. 1837; Benth. in Mart. Fl. Bras. 15, pt. 2:119, *pl. 36*. 1870.

BRAZIL:

DISTRITO FEDERAL: Praia de Sernambetiba (23° S. lat.), near sea level, in flower and fruit, Apr. 4, 1952, *L. B. Smith* 6350 (US, 2 sheets).

The priority of Vellozo's name over Vogel's is clear. Evidence at hand is also in favor of its priority over *Cassia australis* Sims (Bot. Mag. 53:*pl. 2676*. 1826). The date of publication of Vellozo's partial text as 1825 is doubtfully questioned by Borgmeier (Rodriguesia 3, pt. 9:94. 1937), but without definite proof, the authoritative opinions of L. Netto (Archivos Mus. Nac. Rio de Janeiro 5:XI. 1881), "Index Kewensis," and Otto Kuntze (Rev. Gen. Plant. 1:CXLV. 1891) have to be accepted, even if the text volume of Vellozo was known to European botanists only some years later. Moreover, Vellozo's name is accompanied by an exceptionally good plate.

Unfortunately, the Australian *Cassia australis* Sims must change its name because *C. australis* Vell. is a valid species. The proper name for the former apparently is *C. schultesii* Colla (Hort. Ripul., App. 2:344. 1829) which seems to have priority over *C. australis* Sims, as well as over *C. umbellata* Reichenbach (Icon. Bot. Exot. pl. 206. 1830) both cited as synonyms of *C. australis* by Bentham (Rev. Gen. Cassia, Trans. Linn. Soc. London 27:555. 1871).

Cassia cathartica Mart. in Spix & Mart. Reise in Brasilien 2:548. 1828; Benth. in Mart, Fl. Bras. 15, pt. 2:155. 1870.

Cassia hirsuta Vell. Fl. Flumin. 170. 1825; Icon. 4:*pl. 80*. 1835, non L. 1753.

Cassia pachycalyx Vogel, Linnaea 11:699. 1837.

BRAZIL:

MINAS GERAIS: Tres Barras, north of Lagôa Santa, May 2, 1952, *L. B. Smith* 6899 (US). Belo Horizonte, November 1945, *L. O. Williams & V. Assis* 7470 (SI).

SÃO PAULO: Emas, Pirassununga, June 16, 1949, *A. Brandão Joly* 726 (SI).

Cassia aprica Vell. (Fl. Flumin. 169. 1825; Icon. 4:*pl. 76*. 1835), which would have priority over *C. cathartica* Mart., seems to be another species, inasmuch as the original description contains this character: "foliis . . . eglandulatis." However, if Vogel and Bentham were right in synomizing *C. aprica* Vell. with *C. cathartica* Mart., then Vellozo's name would prevail.

Cassia benthamiana Harms, Repert. Sp. Nov. Fedde 20:128. 1924.

BRAZIL:

Goiás: Mun. Corumbá: Serra dos Pirineus, in campo, December 1951, *A. Macedo* 3513 (SI). Caldas Novas, in campo, subprostrate, December 1951, *A. Macedo* 3547 (SI).

Like Harms but independently, I concluded from the "Flora Brasiliensis" that the above specimens might be a new species in the vicinity of *C. decumbens* Benth. (cf. Photo Field Mus. Chicago type series No. 6232), belonging to section *Absus*, series *Rigidulae*, of the subgenus *Lasiorhegma*. The species is also very near the series *Nigricantes* of the same section. As Harms states, the differences from *C. decumbens* are: Petiole nearly absent (first pair of leaflets subsessile), whole plant somewhat pilose or hirsute, racemes simple, very long (20–45 cm.), aureo-hirsute, somewhat viscid, pedicels 1–4.5 cm. long, hirsute, bracts and bractlets linear, persistent, corolla showy, petals obconic, 1.5–2 cm. long, stamens 10, subequal, anthers subsessile, 5 mm. long, barbellate, ovary very hirsute, style pilose, immature pod aureo-hirsute, linear, compressed, 4 cm. long, 5 mm. wide, sessile, narrowed at base.

Cassia tetraphylla Desv. Journ. de Bot. 3:72. 1814; Amshoff, On South Am. Papilionac., Mededeel. Bot. Mus. Herb. Utrecht 52:24–27. 1939; Amshoff in Pulle, Fl. Suriname 2, pt. 2:74. 1939.

Cassia uniflora sensu Benth. in Mart. Fl. Bras. 15, pt. 2:157. 1870, non Spreng. 1820.

BRAZIL:

Rio de Janeiro: Mun. Cabo Frio: Praia do Pontal, Apr. 17, 1952, *L. B. Smith* 6611 (US).

São Paulo: Praia Grande, São Vicente, April 1949, *A. Brandão Joly* No. C (SI 19,821).

Colladon (Hist. Nat. & Med. Casses 130. 1816) founds another *Cassia tetraphylla*, which is invalidated by the earlier homonym of Desvaux. In the same work (p. 131) Colladon founds *C. desvauxii* nov. nom. for *C. tetraphylla* Desv. "non Mill.," and DeCandolle (Prodr. 2:505. 1825) repeats this. However, I cannot find any "*C. tetraphylla* Miller," so I think there has been a mistake on the part of Colladon; and *C. tetraphylla* Desv. is valid, as Amshoff accepts it. Amshoff has examined the type of the species and her conclusions ought to be followed. The species belongs to a widespread and complex group which requires more study.

Andira legalis (Vell.) Toledo, Arquiv. Bot. Estado São Paulo, nov. ser. 2:29. 1946.

Lumbricidia legalis Vell. Fl. Flumin. 306. 1825; Icon. 7:*pl. 105*. 1835.

Andira stipulacea Benth. Anal. Mus. Vindobon. 2, pt. 2:107. 1838; Benth. in Mart. Fl. Bras. 15, pt. 1:292. 1862.

BRAZIL:

RIO DE JANEIRO: Mun. Cabo Frio: Arraial do Cabo, April 1952, *L. B. Smith* 6554 (SI, US).

Toledo rightly took up Vellozo's specific name which already had been identified with *Andira stipulacea* by Bentham.

Dalbergia ecastaphyllum (L.) Taubert in Engler & Prantl, Pflanzenfam. 3, Abt. 3:335. 1891.

Hedysarum ecastaphyllum L. Syst. Nat. ed. 10. 2:1169. 1759.

Hecastophyllum brownei Pers. Syn. 2:277. 1807; Benth. in Mart. Fl. Bras. 15, pt. 1:228. 1862.

BRAZIL:

DISTRITO FEDERAL: Praia de Grumari, near Guaratiba, Apr. 11, 1952, *L. B. Smith* 6541 (SI, US).

SÃO PAULO: Ilha de Santo Amaro, *Hoehne* (SP 29, 614, SI).

PARANÁ: Paranaguá, Matinhos, January 1951, *Hatschbach* 2099 (SI).

SANTA CATARINA: Ilha de Santa Catarina, *Reitz* 5095 (SI). Palhoça, *Reitz* 685; 5523 (SI).

It must be pointed out that the correct original spelling of this specific epithet is *ecastaphyllum*, and not *ecastophyllum* as Taubert himself wrote when publishing the valid name, or *hecastophyllum* as other authors did. Fawcett & Rendle (Flora of Jamaica 4:77. 1920) gave a description based on the Linnean type specimen. I did not change the ending to *ecastaphylla* because it derives from a genus name of Patrick Browne. Heretofore the species has not been known south of Rio de Janeiro.

Tephrosia sessiliflora (Poir.) Hassler, Repert. Sp. Nov. Fedde 16:162. 1919.

Cytisus sessiliflorus Poir. in Lam. Encycl. Suppl. 2:439. 1811.

Tephrosia brevipes Benth. Ann. Nat. Hist. I. 3:432. 1839; in Mart. Fl. Bras. 15, pt. 1:46. 1859.

BRAZIL:

MINAS GERAIS: Mun. Campina Verde: Fazenda Yaraguá, February 1949, *A. Macedo* 1718 (SI).

RIO BRANCO: Bôa Vista, bank of the Rio Branco, Aug. 26, 1951, *G. A. Black & D. Magalhães* 51–12, 994 (SI).

This is a beautiful, erect, seemingly annual plant with dense silvery white tomentum on the young shoots and lower face of the leaves. In the "Flora Brasiliensis" the correct name had not been adopted.

Tephrosia sinapou (Buc'hoz) A. Chevalier, Compt. Rend. Acad. Sci. 180:1522. 1925, as "*singapou*"; C. Wood, Rhodora 51:249. 1949.

Galega sinapou Buc'hoz, Hist. Univ. Reg. Veg. *pl. 994*. 1775.

Galega toxicaria Sw. Prodr. 108. 1788.

Tephrosia toxicaria Pers. Syn. Plant. 2:329. 1807.

BRAZIL:

RIO BRANCO: Rio Cantá, virgin forest, December 1951, *G. A. Black* 51–13,923 (SI).

BOLIVIA:

LA PAZ: Nor-Yungas: Polo-Polo near Coroico, December 1912, *Buchtien* 662 (SI).

ARGENTINA:

SANTIAGO DEL ESTERO: Cultivated, Experiment Station, La Banda, July 1950, *R. F. Cornejo* (SI 17,412).

In this case again an earlier valid name must be accepted for a common species, called "timbo de Caiena" in Brazil (fide A. Ducke) or "barbasco" in Venezuela and used for fish-poisoning.

Aeschynomene filosa Mart. ex Benth. in Mart. Fl. Bras. 15, pt. 1:61. 1859.

VENEZUELA:

GUÁRICO: El Socorro, July 1956, *A. Burkart* 17,203 (SI, US).

This species is an erect perennial with delicate foliage, very small leaflets and flowers, basally produced stipules, and biarticulate loments. Previously it was known only from tropical Brazil (Bahia, Minas Gerais, etc.), and is consequently new to the Venezuelan flora. My determination of the species was confirmed by Dr. Velva E. Rudd of the U. S. National Museum (letter of Oct. 28, 1952).

Stylosanthes angustifolia Vogel, Linnaea 12:63. 1838; Burkart, Darwiniana 3:260. 1939.

VENEZUELA:

BOLÍVAR: Puruey, near the Río Orinoco, January 1948, *F. Tamayo* 3440 (SI).

BRAZIL:

RIO BRANCO: August 1951, *G. A. Black* 12,481; 12,788; 13,096 (SI).

This species of *Stylosanthes* is new to the flora of Venezuela.

Vicia hirsuta (L.) S. F. Gray, Nat. Arrang. Brit. Pl. 2:614. 1821; E. Guinea, Estud. Bot. Vezas y Arvejas Español. 152–156, Inst. N. Investig. Agron. Madrid 1953; Burkart, Leg. Argent. ed. 2, 356, 359. 1952.

Ervum hirsutum L. Sp. Pl. 738. 1753.

BRAZIL:

RIO GRANDE DO SUL: Montenegro, adventive in thickets ("in dumeto"), alt. 600 m., October 1949, *A. Sehnem* 3943 (SI). Porto Alegre, *K. Mohrdieck* 20 (SI).

CHILE:

ACONCAGUA: Termas de Río Blanco, alt. 1,000 m., December 1952, *G. Kunkel* 2189 (SI).

CAUTÍN: Truf-Truf, weed in garden, December 1947, *H. Gunckel* 16,911 (SI).

OSORNO: Trumao, as weed, December 1947, *Gunckel* 16,859 (SI).

AISÉN: January 1946, *E. Barros* 7246 (SI).

This European species seems to be well established now in southern Brazil and especially in south-central Chile.

Periandra mediterranea (Vell.) Taubert in Engler & Prantl, Nat. Pflanzenfam. 3, Abt. 3:359. 1891.

Glycyrrhiza mediterranenea Vell. Fl. Flumin. 317. 1825; Icon. 7:*pl. 145*. 1835; edit. L. Netto, Archivos Mus. Nac. Rio de Janeiro 5:297. 1881.

Periandra dulcis Mart. ex Benth. Ann. Mus. Vindobon 2, pt. 2:121. 1838; in Mart. Fl. Bras. 15, pt. 1:135, *pl. 35*. 1859.

BRAZIL:

MINAS GERAIS: Mun. Jaboticatubas: Serra do Cipó, April 1952, *L. B. Smith* 7079 (US). Mun. Ouro Preto: Saramenha, December 1950, *A. Macedo* 2809 (SI). Mun. Itabirito: Pico de Itabirito, alt. 1500 m., December 1948, *Palacios, Balegno & Cuezzo* 3862 (LIL).

SÃO PAULO: Caieiras, January 1945, *W. Hoehne* (SP 46,111, SI). Itararé, *A. Brandão Joly* 724 (SI).

PARANÁ: Jaguariaiva, in campo, October 1911, *P. Dusén* 13,214 (SI). Mun. Palmeira: Colonia Quero-Quero, November 1951, *G. Hatschbach* 2567 (SI).

The above combination of P. Taubert is valid, although he did not mention a basionym. The International Code of Botanical Nomenclature (Utrecht, 1952), article 42 (1956, Art. 32), accepts such new combinations if published before 1953. Evidently Taubert took up Vellozo's name from the publications of Bentham, who cited it as a synonym of *Periandra dulcis*.

Vellozo's plate is not bad; the newer one in "Flora Brasiliensis" is better but wrong in one character in which Vellozo's plate is correct: the flowers are not shown in their natural resupinate position. All specimens seen by the writer have resupinate flowers, i. e., with the vexillum lowest. This resupination seems to be general in the flowers of most or all species of *Periandra*, *Clitoria*, *Cenirosema*, and *Canavalia*.

Galactia glaucescens H. B. K. Nov. Gen. & Sp. 6:338 (or 431). 1823; DC. Prodr. 2:238. 1825.

Collaea glaucescens Benth. Ann. Mus. Vindobon. 2, pt. 2:128. 1838; in Mart. Fl. Bras. 15, pt. 1:150. 1859; M. Micheli in Warming, Symb. Fl. Bras. Centr., Vidensk. Meddelels. Nat. For. Kjöbenhavn 5–8:82. 1875.

BRAZIL:

MINAS GERAIS: Lagôa Santa, April 1952, *L. B. Smith* 6728 (SI).

BOLIVIA:

SANTA CRUZ: Buena Vista, September 1916, *J. Steinbach* 2809 (SI).

The type of this species came from Ecuador: ". . . in Regno Quitensi pr. Penipe" according to the original description. De Candolle (loc. cit.), adds: ". . . ad ripam flum. Cuellae." This last locality is on the label of Kunth's specimen (cfr. phototype collection Field Mus. Chicago no. 2388). The Brazilian plant has the leaflets broader and more rounded than the type but otherwise it is the same.

This is a real *Galactia* and, because of the clearly diadelphous stamens, not a *Collaea*, the vexillar filament being entirely free. It is an ascending plant, but the difference of erect versus voluble has no value as a generic distinction, many real *Galactiae* being nonvoluble. Technically, the taxon *Collaea glaucescens* Benth. is not a combination based on the earlier *Galactia glaucescens* H. B. K., but an independent entity; nevertheless, they are synonymous, as already recognized by Bentham.

The species sometimes develops male flowers by abortion, their ovary being present but the style reduced to a little hook. Otherwise the flower is like the normal hermaphroditic one. Such an andromonoecism has been recorded in the generic diagnosis of *Galactia* by Kunth (loc. cit.) and has been observed in Caribbean *Galactiae*. I. Urban (Symb. Ant. 2:307. 1900) writes: "Ut jam ill. Jacquin (Hort. Vindob. I p. 32) observavit, flores (praeter hermaphroditos) nonnulli masculi ovario plus minus evoluto sed stylo abortivo in pluribus speciebus inveniuntur."

Phaseolus halophilus C. V. Piper, Contr. U. S. Nat. Herb. 22:675. 1926.

BRAZIL:

DISTRITO FEDERAL: Guaratiba, Praia de Grumari, Apr. 11, 1952, *L. B. Smith* 6526 (US).

This species, heretofore known only from the type collected by Salzmann more than a century ago, has much affinity with *Phaseolus candidus* Vell. (*P. membranaceus* Benth.), but the flowers are much smaller (15 mm. long). Smith's specimen extends its distribution 1,300 km. to the south, but the habitat remains the same, the tropical seashore.

Erythrina speciosa Andr. Bot. Reposit. 7:*pl. 443*. 1806; Krukoff, Am. Sp. Erythrina, Brittonia 3:243. 1939.

Erythrina reticulata Presl, Symb. Bot. 2:22, *pl. 68*. 1832; Benth. in Mart. Fl. Bras. 15, pt. 1:174. 1859.

BRAZIL:

SANTA CATARINA: Itajaí, secondary woods (capoeira), July 17, 1950 in flower, *R. Reitz* 3604 (SI). Local name: "Bico de papagaio."

Here again the correct name according to present rules is not the one used in the monumental "Flora Brasiliensis." Reitz's specimen extends the area a little farther south (Krukoff cites Minas Gerais, Rio de Janeiro, São Paulo, and Paraná).

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